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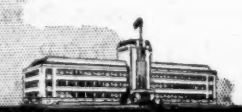

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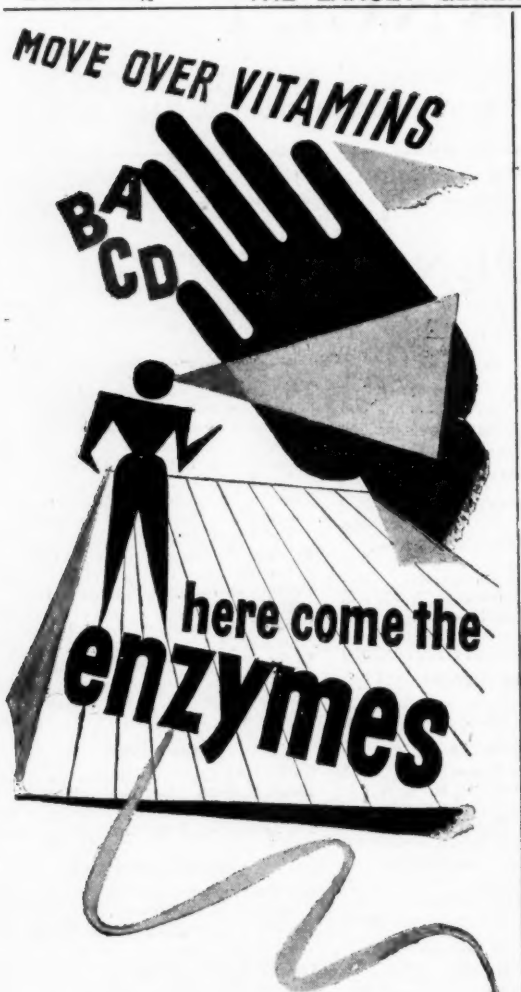


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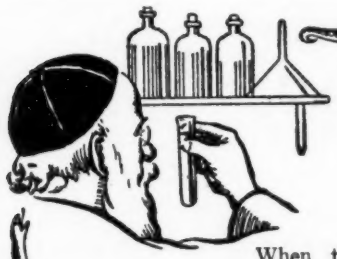

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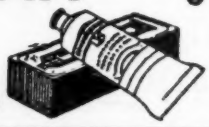

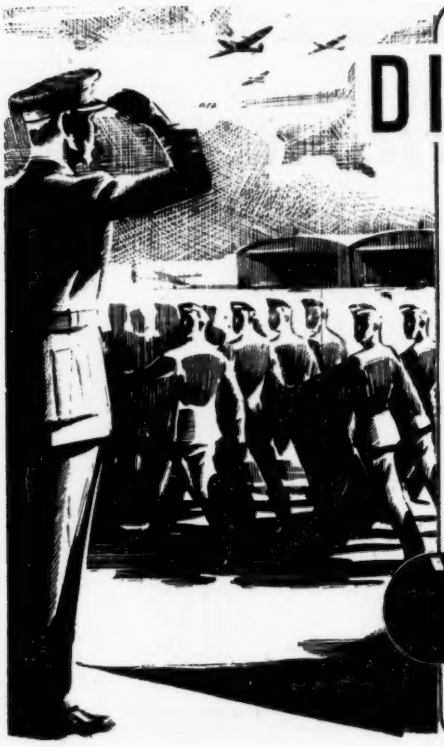

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The greatly increased retention in the new 'Examen' of the antianaemic activity of liver is such that an injection of 1 cc., in place of the former 3-4 cc., produces erythrocyte and reticulocyte responses which satisfy the most exacting of published criteria [1, 2].

The 1 cc. injection, at the same cost as the original 2 cc., and with the considerably increased potency, makes the treatment of pernicious anaemia still easier and less expensive for the patient.

1. Della Vida and Dyke (1942) Lancet **2**. 275. Riddle (1940) Amer. J. med. Sci. **200**.145. Isaacs et al. (1938) J. Amer. med. Ass. **111**.2291
2. Minot et al. (1928) Amer. J. med. Sci. **175**. 599.

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| Nicotinic Acid | 1.7 mg. ,, |
| Vitamin $B_6$ | 0.45 mg. ,, |
| Vitamin E | 8.0 mg. ,, |
| Manganese | 4.0 mg. ,, |
| Iron | 2.7 mg. ,, |
| Copper | 0.45 mg. ,, |
| Protein | 30% |
| Available Carbohydrate | 39% |
| Fibre | 2% |
| Calorific Value | 104 per oz. |

# DESERT CLIMATE

## PHYSIOLOGICAL AND CLINICAL OBSERVATIONS *

W. S. S. LADELL, M B CAMB. J. C. WATERLOW, M B CAMB.

M. FAULKNER HUDSON, M R C P; MAJOR R A M C

THIS report is an outline of observations made at Shaiba, in Southern Iraq, on British Army personnel during the summer of 1943. Regular measurements were made on a number of fit men from May to October. The majority of cases of effects of heat admitted to a British general hospital during that time were investigated.

Shaiba is situated near the head of the Persian Gulf. The course of the weather is shown in fig. 1. Maximum temperatures above 100° F. occurred daily for four months, and there were two periods, one of a week and the other of a fortnight, when the temperature each day was above 115° F. (fig. 3). The humidity was low throughout; the dew-point was usually between 50° and 60° F., and the relative humidity at midday about 15%; thus the climate was a true desert climate (Buxton 1923). These figures give a fair estimate of the conditions to which the men were exposed, for temperatures in sheds where many men worked were found to be within 2° F. of the screen temperatures from which fig. 1 is drawn.

TABLE I

(A) *Chemical Features of Various Types of Case*

| Findings | Controls | | Hyperpyrexia | | Borderline hyperpyrexia | | Type I | | Type II | |
|---|---|---|---|---|---|---|---|---|---|---|
| | obs | | obs | | obs | | obs | | obs | |
| Urine vol. (c.cm.) | 45 | 753 [1] | 10 | 2516 | 9 | 2197 | 35 | 1161 | 50 | 2713 |
| Urine-chloride (g. NaCl) per day | 45 | 4·46 [1] | 10 | 4·42 | 9 | 2·37 | 35 | 0·98 | 50 | 3·47 |
| Red cells (mill. per c.mm.) | .. | .. | .. | .. | .. | .. | 18 | 4·96 | 21 | 4·34 |
| Hb (%) | 100 | 17·8 | 10 | 16·1 | 8 | 17·4 | 25 | 20·1 | 27 | 17·2 |
| Protein (%) | 118 | 6·41 | 11 | 6·81 | 8 | 6·51 | 26 | 7·28 | 31 | 6·26 |
| Whole-blood chloride (m. eq. /l.) | 121 | 81·90 | 11 | 74·1 | 9 | 76·1 | 27 | 61·0 | 30 | 77·5 |
| Plasma chloride (m. eq./l.) | 112 | 100·40 | 11 | 88·3 | 8 | 92·2 | 20 | 79·0 | 31 | 86·8 |
| Blood-urea (mg. per 100 c.cm.) | 21 | 47·5 [2] | 11 | 47·8 | 9 | 41·1 | 26 | 103·0 | 31 | 26·1 |
| Sweat chloride (%) as NaCl | 11 3 | 0·27 | 6 | 0·36 | 5 | 0·39 | 23 | 0·44 | 31 | 0·53 |

(B) *Statistical Significance of Differences Found*

| Findings | Controls compared with— | | | | Hp compared with— | | Type II compared with— | |
|---|---|---|---|---|---|---|---|---|
| | Hp | Borderline hp | Type I | Type II | Borderline hp | Type I | Type II | Borderline hp |
| Hæmoglobin .. .. | sig | not | sig | not | not | not | sig | not |
| Protein content .. | not | not | sig | not | not | sig | sig | not |
| Whole-blood chloride | sig | sig | sig | sig | not | sig | sig | not |
| Plasma chloride .. | sig | sig | sig | sig | not | not | sig | not |
| Blood-urea .. .. | not [3] | not [4] | sig [3] | sig [4] [5] | not | sig | sig | sig |
| Sweat chloride.. .. | sig | not | sig | sig | not | sig | sig | not |

1. Values for periods when maximum air temperature was above 102° F.
2. Value for week 12 (hottest week of year).
3. Compared with week 12. 4. Compared with week 16.
5. Compared with week 20.

Obs = Number of observations; Hp = hyperpyrexia; Sig = significant; Not = not significant.

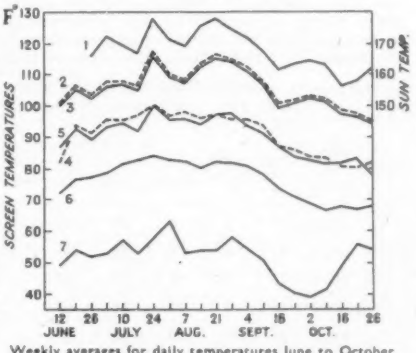
Significance of differences judged from standard error of the difference between the means, or in some cases by t test.

* A report to the Medical Research Council. To be concluded in our next issue.

### OBSERVATIONS ON FIT MEN

Physiological and biochemical observations were made each week from May to October, 1943, on 24 soldiers drawn from various units in the area. These were made to serve as controls for similar observations made on cases of effects of heat; and to determine what changes, if any, took place during the hot weather. The subjects had all been in the area long enough for rapid acclimatisation to have taken place (Dill 1938, Bazett et al. 1940).

Fig. 1




Weekly averages for daily temperatures June to October at Shaiba.

(1) Maximum temperature—black bulb thermometer in sun in vacuo.
(2) Maximum temperature
(3) Temperature at 2 pm
(4) " " 8 am
(5) " " 9 pm
(6) Minimum temperature
(7) Dew point.

(2)–(6): screened thermometer.

With certain important exceptions described in the next section, it was found that the control subjects showed no deviations from the normal either physiological or biochemical. The average results obtained from the analysis of blood and urine are shown in table I(A) (columns 1 and 2). Thus any deviation from the commonly accepted normal levels found in cases of effects of heat could be attributed to the pathological condition and not to the physiological effects of the climate.

#### CHANGES IN THE SUBJECTS DURING THE HOT WEATHER

*Cardiovascular system.*—The pulse-rate of the subjects lying down remained constant throughout the summer at an average level of 65 beats per minute. The difference between standing and lying pulse-rate has been used experimentally as an index of acclimatisation (Scott, Bazett and Mackie 1940, Bean and Eichna 1943). The difference increases on first exposure to heat, and falls again as acclimatisation develops. It is therefore of interest that in this series of control subjects the difference did not increase as the hot weather came on. The average difference for the whole summer was 20 beats per min.; the upper limit in these men was 36. Much greater differences were found in some patients with heat exhaustion.

At the beginning of the summer the average blood-pressure, taken on the subjects lying down, was 112/72 mm. Hg. As the weather became hotter, the BP gradually fell, to a minimum of 98/62 in mid-August. Thereafter it rose again, but by the end of October had not reached the initial level found in May. The pressure taken with the subjects standing up changed in the same way, falling from 113/83 in May to 100/75 in August. This fall in BP occurred in all the men; it was not accompanied by changes in pulse-rate or exercise tolerance, and its interpretation is obscure.

*Salt and water balance.*—All the subjects lost weight in the hot weather, and some of them lost as much as 7% of their initial body-weight (fig. 2). When the weather became cooler they recovered weight.

The volume of urine passed in 24 hours also fell as it got hotter, and subjects who showed the least weight loss showed the least change in 24-hour urine volume. In a period when the air temperature remained below 102° F. the average 24-hour urine output for a group of men was 1004 c.cm. When the daily maximum air temperature was above 108° F. their average output fell to 715 c.cm. Another group of 10 men † had an average daily output

† This group of men was extra to the 24 who were observed each week.

at the beginning of July of 880 c.cm., and a fortnight later, when the temperature was 5° F. higher, their average output was 660 c.cm. The changes in each group are statistically significant. A urinary output of less than 500 c.cm. in 24 hours was common in the hottest periods; that is, these men had a urinary excretion rate as low as that of men in temperate climates in severe water debt (Ladell 1943). The diuresis after drinking water was less when the room temperature was above 95° F. than when it was below. The first observation shows that these men were not drinking any water in excess of their requirements; the second that some of these apparently

TABLE II—DISTRIBUTION OF BLOOD-UREA VALUES (MG./100 C.CM.) AMONG CONTROLS

| Week | Av. max. air temp. | obs | % of values | | | | | Mean for week |
|---|---|---|---|---|---|---|---|---|
| | | | Below 20 | 20–30 | 30–40 | 40–50 | Above 50 | |
| 7 | 106·2 | 22 | 0 | 9 | 68 | 23 | 0 | 36·8 |
| 8 | 103·1 | 21 | 0 | 5 | 71 | 14 | 10 | 37·1 |
| 12 | 117·4 | 21 | 0 | 10 | 14 | 28 | 48 | 47·5 |
| 16 | 116·0 | 23 | 0 | 30 | 48 | 13 | 9 | 36·2 |
| 21 | 102·0 | 25 | 28 | 60 | 12 | 0 | 0 | 22·2 |

normal individuals contracted a slight water debt when it became hot.

A low urine output was associated with a high blood-urea. In week 7 (average daily maximum temperature 106° F.) the mean blood-urea for the control group was 36·8 mg. per 100 c.cm.; in week 12 (average daily maximum temperature 117·5° F.) the value was 47·5 mg. The difference is statistically significant. Values above 50 mg. were common in the hot weather (table II).

Loss of weight, low 24-hour urine volume, and raised blood-urea are features of dehydration. Calculation based on the rate of weight loss at work and at rest when the daily maximum temperatures were about 115° F. showed that a daily intake of the order of 7½ litres per day was needed to keep in water balance. Intake charts kept by the subjects when it was some 10° cooler showed a daily fluid intake of 5½ litres; to this must be added 1 litre for the water content of the food. The subjects stated that they increased their fluid intake when it became hotter, so it appears that their actual water intake was probably in most cases enough for balance. The dehydration cannot, therefore, be entirely attributed to a failure to drink enough water.

Dehydration was most probably the result of insufficient intake of salt (NaCl). Urinary chloride output was low: in a period when the daily maximum temperature was between 102° and 108° one group of men excreted an average of 5·88 g. (as sodium chloride) per day per man; when daily maximum temperatures were above 108° the average daily excretion was 3·03 g. These men were receiving the full salt ration of 21 g. per day (in this Command the usual 14 g. is supplemented by an extra 7 g.). An additional 10 g. daily may have been available from tinned foods, giving a total maximum intake of 31 g. per day. The actual intake may have been less than this, owing to unavoidable waste in the cookhouse and at the table, and failure to take all that was provided. During the hot weather one individual over several different periods of 24 hours excreted no chloride in his urine. But diminished chloride content, either of whole blood or of plasma, was not found in this or any other control individual, so there was no other direct evidence of salt deficiency.

Salt requirements were estimated by determining the chloride content of the sweat. Sweat was collected from the arm during light exercise; the arm was thoroughly washed in distilled water and enclosed in an impervious bag reaching to the shoulder. It was found that those subjects who lost most weight had the greatest chloride concentration in their sweat. Nine subjects (group A) had an average rate of weight loss, in weeks when sweat samples were taken, of 11·7 oz.‡ per week; the average chloride content of their sweat was 0·32% (as NaCl) (34 samples). The average rate of weight loss for the remaining 15 subjects (group B) for the same weeks was 1·6 oz. per week, and the chloride content of their sweat (45 samples) 0·21%. These differences are statistically significant.

Observations were made of the weight losses during work and during rest, and it was calculated from this that the sweat loss per day during the hottest weeks was about 7 litres. From this figure and the chloride concentration in the sweat, group B were losing an average of 14·7 g. of salt per man per day, and group A 22·4 g.; thus group B's sweat requirements were well covered by the salt ration but group A's requirements may not have been. It has already been pointed out that a variable amount of salt, up to 10 g. a day, was available from the food in excess of the ration. In group B an amount equal to this extra salt was excreted in the urine, but for group A a proportion was used to make up the deficit between salt ration and salt requirement, so that the amount lost in the urine was less in group A than in group B; thus on one particular morning the average loss of sodium chloride in the urine was 0·22 g. per hour for group A, and 0·41 g. per hour for group B. Sufficient data are not available, however, to give 24-hour losses in the two groups separately.

These observations suggest that there are certain individuals who have a higher salt requirement than the average; they react to high rates of sweating by cutting down salt loss in the urine to a minimum. The chloride content of the body fluids is kept up by a reduction in the total fluid volume, shown by the loss in body-weight. Measurements of extracellular fluid and plasma volumes were made but varied too much for any positive conclusions to be drawn.

### FIELD TESTS ON THE SUBJECTS

Lee (1941) has shown that the performance of a given amount of work in a hot room deteriorates both if water intake is not maintained during the exposure to heat and if a large dose of salt is taken before the exposure. We have confirmed these observations.

When the room temperature was 94° F. dry bulb, 68° F. wet bulb, the subjects refrained from drinking over a period of 3 hours and then carried out a light exercise test. The maximum heart-rates during exercise averaged 6·4 per min. higher, and the heart-rates standing after 10 minutes' recovery averaged 7 per min. higher than the corresponding rates the previous week when the subjects were drinking and conditions were otherwise the same.

Ten grammes of salt in a litre of water were given to the control subjects already receiving their full salt ration. One hour later a light exercise test was carried out in the

TABLE III—CHANGE IN CHLORIDE CONTENT OF SWEAT DURING THE SUMMER

| | Before first hot spell | | After first hot spell | |
|---|---|---|---|---|
| No. of specimens .. | 32 | 100% | 53 | 100% |
| No. above 0·35% NaCl .. | 2 | 6·25% | 11 | 20·7% |
| No. above 0·4% NaCl .. | 0 | 0 | 9 | 17% |
| No. above 0·45% NaCl .. | 0 | 0 | 5 | 9·4% |
| Maximum concentration observed .. | 0·36% | | 0·60% | |

sun at a temperature of about 110° F. Their performance as judged by the heart-rate was not affected, but they sweated less than on other occasions when conditions were the same except that fresh instead of salt water was given; their rate of weight loss was an average of 20 oz. per hour instead of 24 oz.; and their rectal temperature rose more, the average increase being 1·16° F. instead of 0·65° F. These differences are statistically significant. No changes were found in the blood.

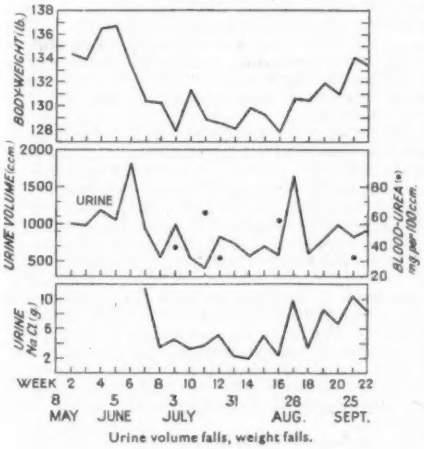
After single large doses of salt on this and other occasions the urinary salt loss was increased and the chloride content of the sweat also rose. Considering only the sweat samples taken in this test, the average chloride content of the sweat after fresh water was 0·25%, and after salt water 0·33%. This difference is statistically significant. From this it appears that single large doses

‡ Weights are given in ounces because this was the unit in which they were measured.

Fig. 2

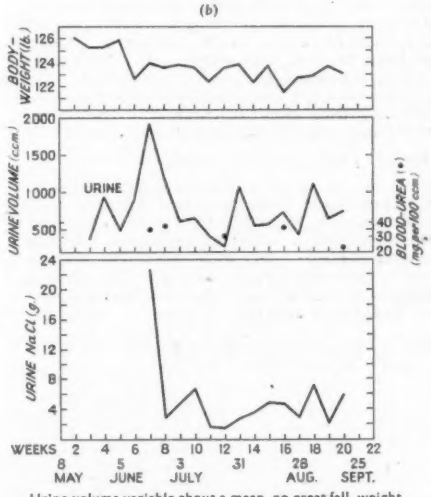
WEIGHT LOSS OF NORMAL SUBJECTS CORRELATED WITH URINE VOLUME

(a)


BODY-WEIGHT (lb.)
URINE VOLUME (c.c.m.)
URINE
BLOOD-UREA (•) (mg. per 100 c.c.m.)
URINE Na Cl (g.)
WEEK 2 4 6 8 10 12 14 16 18 20 22
8 MAY 5 JUNE 3 JULY 31 28 AUG. 25 SEPT.

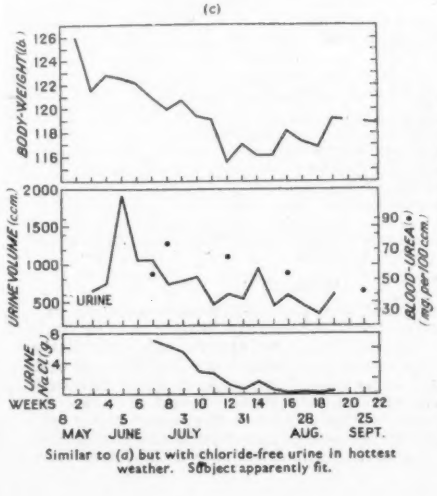
Urine volume falls, weight falls.

(b)


BODY-WEIGHT (lb.)
URINE VOLUME (c.c.m.)
URINE
BLOOD-UREA (•) (mg. per 100 c.c.m.)
URINE Na Cl (g.)
WEEKS 2 4 6 8 10 12 14 16 18 20 22
8 MAY 5 JUNE 3 JULY 31 28 AUG. 25 SEPT.

Urine volume variable about a mean, no great fall, weight fairly steady.

(c)


BODY-WEIGHT (lb.)
URINE VOLUME (c.c.m.)
URINE
BLOOD-UREA (•) (mg. per 100 c.c.m.)
URINE Na Cl (g.)
WEEKS 2 4 6 8 10 12 14 16 18 20 22
8 MAY 5 JUNE 3 JULY 31 28 AUG. 25 SEPT.

Similar to (a) but with chloride-free urine in hottest weather. Subject apparently fit.

of salt may be physiologically uneconomical. There are other factors, not yet fully understood, which influence the salt content of the sweat. Sweat samples were obtained at intervals throughout the year and at the end of the summer much higher concentrations of chloride were found than earlier on (table III), in some cases surpassing those found in sweat after a dose of salt.

## EFFECTS OF HEAT

The data that follow are drawn from a series of 169 cases. Of these, only 3 were Indians; but this low figure does not reflect the true incidence in Indian troops. The majority were admitted to a single British hospital.

The series is representative of all types of case occurring in the area, and of all degrees of severity, with certain exceptions:

1. It contains no fatal cases. Three patients in the area did succumb to effects of heat, but they died before they could be seen.
2. Many very mild cases were treated in their unit, and never reached hospital. They are therefore not represented in the series.
3. No cases are included of effects of heat confined to the skin—i.e., without general symptoms and signs.
4. No cases are included in which effects of heat were superimposed upon some other disease.

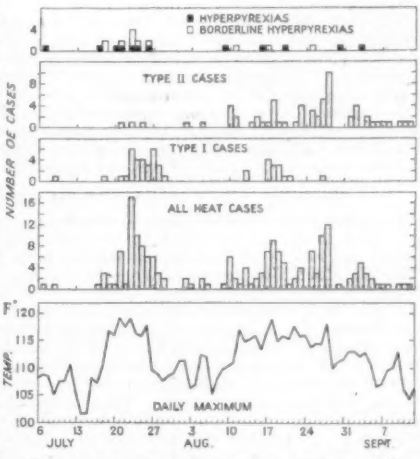
## HYPERPYREXIA

Twelve patients were seen, who had a rectal temperature of 107° F. or more. The clinical picture in these cases did not differ from that described in standard textbooks (Manson 1940, Rogers and Megaw 1942, Willcox 1942, War Office *Memoranda on Medical Diseases in Tropical and Subtropical Areas* 1941). Therefore only a brief description is necessary.

### ÆTIOLOGICAL FACTORS

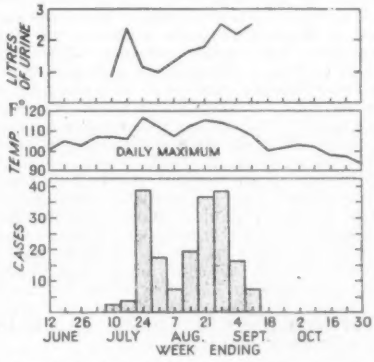
*Age.*—It has been repeatedly stated that increasing age predisposes to hyperpyrexia. Of the 12 cases 9 were

Fig. 3



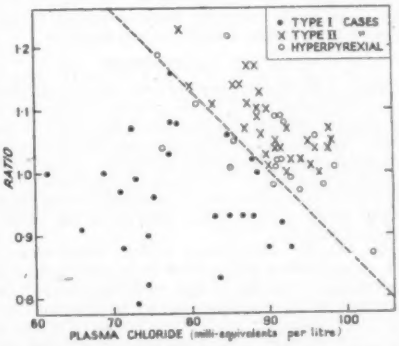

Correlation of case-incidence (different types) with daily temperature.

Fig. 4




Correlation of cases (all types) with average temperature per week; average urine outputs for cases on admission also shown.

Fig. 5




Reduction ratio and plasma chloride; the line is drawn to the equation

$P + 75\,R = 106{\cdot}8$

where P = Plasma chloride in m. eq./l.
R = Reduction ratio.

over 30, compared with 40% over 30 in the whole series.

*External temperature.*—Of the 12 cases 5 occurred during the hottest week of the summer, July 19–26 (fig. 3). The others occurred sporadically between the beginning of July and the beginning of September.

*Other factors.*—In no case was there a history of excessive exposure to the sun, of unusually hard physical work, or of lack of sleep. In fact, many patients were doing less than the ordinary amount of work. In one only was excessive intake of alcohol a possible factor.

### CLINICAL AND LABORATORY FINDINGS

In most patients the onset was sudden. All except one gave a history of sweating having stopped over a period varying from 3 days to half an hour before the attack. This is in agreement with the findings of Willcox in Iraq in 1917 (Willcox 1920). Frequency of micturition has also been repeatedly described as a warning sign of hyperpyrexia. A frequency of more than four times in 24 hours may be considered abnormal in that climate, and 6 of the 12 hyperpyrexial cases gave a history of frequency, according to this definition. In all cases copious amounts of urine were passed. The main elements in the clinical picture were: a rectal temperature of 107° F. or more; a skin that was hot and dry to the touch all over the body; and partial or complete loss of consciousness. Abdominal and tendon reflexes were absent in only 3 cases.

On admission the patients were producing large volumes of urine but had stopped drinking some time previously, owing to unconsciousness. After admission their urine outputs were higher than the outputs of other patients in the same ward (2516 c.cm. compared with 1376 c.cm.). After sweating was re-established the excess of fluid intake over urine output was still low in comparison with other patients (720 c.cm. compared with 3030 c.cm.) These figures demonstrated the negative water balance stressed in such cases by other authors (Hearne 1932) as they leave no margin for sweat loss. Blood samples taken on or soon after admission from 11 out of the 12 cases showed diminished hæmoglobin, and a chloride content in both whole blood and plasma slightly less than normal (table I). Blood-urea and plasma-protein levels were within the limits found for the control subjects. The sodium content, estimated on 2 samples only, was also normal. Though there was some chloride deficiency in the blood there was an apparent anomaly in that all these cases had chloride in their urine; the average daily excretion for the first 2¼ days was 4·42 g.; but urine passed soon after admission at the time of taking the blood samples contained less chloride than samples passed later.

### TREATMENT

Treatment followed standard lines. The body temperature was reduced by wet sheets and fanning, and the patients were then transferred to an air-conditioned ward (temperature about 80° F.). Convalescence was rapid. Sweating was in most cases restored within 12 hours of the onset. The quick recovery of sweating contrasted with the slow restoration to normal found in patients with type II heat exhaustion, described later.

### Discussion

The strictly hyperpyrexial cases all had a rectal temperature of 107° F. or over and all showed clouding or loss of consciousness. A definition of hyperpyrexia based on clinical features such as these, and not on ætiology, must be purely formal. It is to be expected that in other cases the same fundamental causes may be at work, but, because of early treatment, or for some other reason, the body temperature may not reach extreme heights.

In fact, in the present series, there were 12 patients whose condition resembled hyperpyrexia in all essential features, except the height of body temperature and the presence of unconsciousness or mental confusion. These may be called "borderline hyperpyrexial cases." Of these 12, 9 were admitted in the hottest week. As in hyperpyrexia, the onset was sudden with defective sweating. The rectal temperature on admission averaged 104·8° F. Temperatures as high as this were not found in cases of other types. The skin was dry on admission in 10 cases, but sweating was quickly restored with immediate recovery.

In both these groups, the history and the dryness of the skin on admission suggest that sweating had stopped completely over the whole body. No local cause for this was found; the skin appeared normal, and prickly heat was not severe. From the rapid onset, and the equally rapid recovery, it seems probable that the failure was of central origin. The reason for it is not clear. In no case was there any evident precipitating factor, either physical or psychological.

The laboratory findings fit in with the theory that the first breakdown is in the sweating mechanism. Although sweating had stopped, water absorption continued; the patients often said they felt hot and dry and had kept on drinking just before the attack. The history of frequency of micturition shows that there was a compensatory increase in urine excretion. The chemical findings suggest that this increase was inadequate and delayed, and that consequently water accumulated in the body and dilution occurred; this was indicated by the low hæmoglobin and diminished chloride content of the blood taken on admission. When urine excretion did increase sufficiently the excess water was lost so that there was an apparent and transient negative water balance; when the body fluids became more concentrated again, chloride was excreted in the urine as there had never been any gross deficiency.

Recovery was rapid and uneventful. Blood samples taken just before discharge were quite normal in 5 cases, but in 5 other cases the chloride content of the plasma was still not as high as in the control subjects. These cases had not been treated with extra salt. This suggests that there may have been after all a true salt deficiency in some cases; a cause for this was found in the sweat. The average chloride content of the sweat collected from 6 cases was 0·39% (as sodium chloride).

## HEAT EXHAUSTION TYPE I

The classification of heat exhaustion is confused. Various subdivisions have been described, such as heat prostration and syncope, subacute effects of heat, and sun traumatism, but their definition is not clear. In the present series two types of case were seen, which have been called heat exhaustion types I and II. The clinical and chemical features of the two types are summarised and contrasted in tables I and IV.

TABLE IV—COMPARISON OF CLINICAL FINDINGS IN HEAT EXHAUSTION, TYPES I AND II

| | Type I | Type II |
|---|---|---|
| Number in group | 45 | 55 |
| *History—* | | |
| Vomiting | 73% | 4% |
| Cramps | 70% | 4% |
| Defective sweating | 13% | 87% |
| Increased frequency of micturition * | 0 | 82% |
| *On admission—* | | |
| Dryness of skin | 5% | 40% |
| Desquamating prickly heat | 7% | 80% |
| Signs of dehydration | 50% | 2% |
| Pulse volume poor | 33% | 0 |
| Lying pulse-pressure less than 30 mm. Hg | 46% | 2% |
| Blood-pressure not maintained on standing | 72% | 2% |
| Colour of skin | Pale | Red |
| Av. lying pulse-rate (beats/min.) | 90 | 76 |
| Av. incr. of pulse-rate on standing (beats/min.) | 40 | 20 |
| Av. lying blood-pressure (mm. Hg) | 111/79 | 121/69 |
| Av. rectal temperature (° F.) | 100·6 | 100·9 |
| Av. mouth temperature (° F.) | 98·2 | 99·5 |
| Av. frequency of micturition (per 24 hr.) | 2–3 | 9 |
| Av. weight gain in hospital (oz.) | 121 | 41 |

* By "increased frequency of micturition" is meant passage of urine 5 times or more in 24 hours.

### INCIDENCE

The great majority of type I cases were seen in the two hottest weeks of the summer (figs. 3 and 4). In both periods they did not begin to appear until the daily maximum temperature had been above 115° F. for 3 or 4 days running. From this there appears to be a direct and cumulative relation between the height of the external temperature and the incidence of cases of this type. Two-thirds of the type I cases were admitted in July, and one-third in August. This is in spite of the fact that

there were more hot days in August than in July. In August, the dry-bulb temperature reached 115° F. on 13 days, in July on only 8 days. This suggests that by August most of those susceptible had already fallen sick and been evacuated to a cooler area.

### HISTORY

The history was usually short—2–4 days. Complaints of giddiness, anorexia, headache and constipation were present in varying combinations in all cases. The salient features of the history were vomiting and cramps. The vomiting always began before admission to hospital, and probably precipitated admission. Half the patients who vomited did so more than once, and some vomited 6–8 times.

Cramps, when present, preceded vomiting. The commonest sites were the legs and thighs, followed by arms, abdomen, hands, feet and jaw.

With rare exceptions, cases of this type had no history of diminished sweating. Frequency of micturition was not present. Several patients stated spontaneously that their urine output had decreased since the onset of symptoms.

### CONDITION ON ADMISSION

These patients on admission looked exhausted, anxious and ill. They were pale and sweating profusely, with a cool skin. Often they showed the classical signs of dehydration—inelasticity of the skin, and sunken, hollow eyes. Prickly heat was sometimes present, but was not prominent or severe. The rectal temperature was slightly raised; the average was 100·6° F. The elevation was slight but constant: 83% of cases had a rectal temperature of more than 100·0° F., whereas, even in that climate, such levels were rare in control subjects at rest.

The average pulse-rate on admission was 90 beats per min., compared with 65 in controls. In 35% the pulse-volume was poor. In patients lying down the systolic pressure was occasionally low; it was less than 90 mm. Hg in only 4 cases. In the others it was well maintained. The diastolic pressure in most cases was higher than in the controls; a level of more than 80 mm. Hg was found in 70% of type I cases, in 20% of type II and in 2% of observations on controls. The pulse-pressure was therefore low; it was less than 30 mm. Hg in nearly half the type I cases; in 9 of them it was less than 20 mm. Pulse-pressures as low as this were not found in control subjects, nor in patients of other types. The possible significance of these findings will be discussed below. The effect of standing was dramatic. The pulse became progressively more difficult to feel and more rapid. The BP fell, and often could not be taken because the sounds were inaudible. The patient became increasingly pale, began to sweat profusely, to yawn and to complain of dizziness. He was obviously on the verge of syncope after standing for only one or two minutes.

In the first 24 hours after admission type I cases passed relatively little urine; often the volume was less than 750 c.cm. It was heavily pigmented and the specific gravity was often over 1020. Out of 32 samples only 1 had a chloride concentration above 0·1%, 10 contained no chloride at all, and 8 others had less than 0·01%. With treatment by intravenous saline and fluids by mouth the urine volumes increased, and the average daily output for the first 2½ days in hospital was: for 26 cases in the open ward 1122 c.cm., and for 10 cases in the air-conditioned ward 1376 c.cm. These volumes are low when it is considered that the patients were inactive and drinking up to 16 pints of water per day. The urines remained low in chloride for the first 2½ days. The average daily excretion was 0·98 g. (as NaCl); this is significantly lower than the chloride excretion of the control subjects who had the same salt ration as the hospital patients, and who were leading an active life.

Blood samples were taken from 27 cases of type I heat exhaustion soon after their admission. The average values obtained for the various analyses are shown in table I. A raised hæmoglobin and plasma-protein content indicated hæmo-concentration. The chloride contents of the whole blood, and that of the plasma were both grossly diminished; the drop in the whole blood chloride was more marked than that of the plasma chloride. The ratio

$$\frac{\text{Observed value for whole blood}}{\text{Control value}} \div \frac{\text{Observed value for plasma}}{\text{Control value}} = \text{(Reduction ratio)}$$

was below 1 except for mild cases § and the average ratio was 0·95.

Of 27 cases 12 had a reduction of 25% or more in the whole-blood chloride (i.e., were below 60 milli-equivalents per litre), and of 26 cases 10 had an equivalent reduction in the plasma chloride (i.e., were below 75 milli-equivalent per litre). Plasma sodium was estimated on 5 samples only and was found to be only slightly diminished.

The blood-urea was raised in all cases. The lowest value was 46·4 mg. per 100 c.cm.; 12 out of 26 cases had levels above 100 mg. In spite of the high blood-urea and low urine volumes the urea content of the urine was low (average for 10 cases, 2·7%). The average ratio between urea concentration in urine and urea concentration in plasma (U/P ratio) was, for the 9 cases in which it was measured, 40·5.

### PLASMA AND EXTRACELLULAR FLUID VOLUME

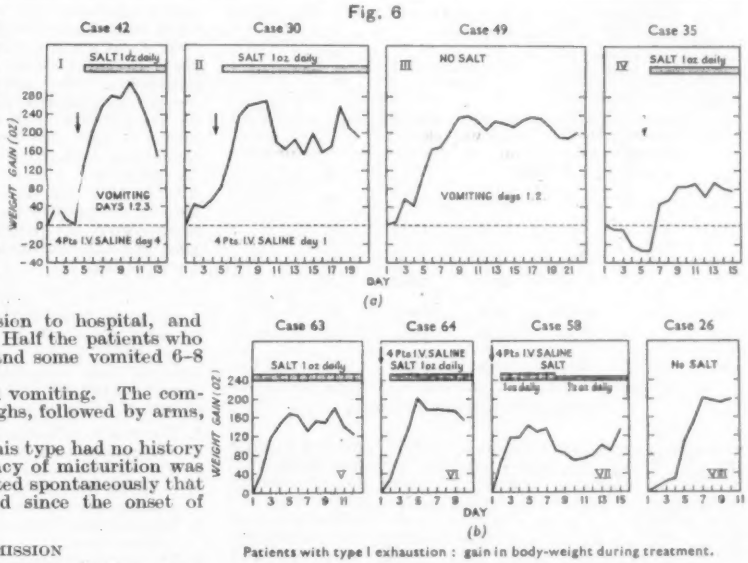
In 8 cases plasma and extracellular fluid volumes were measured on admission, and in 7 of these the measurements were repeated before discharge. Plasma volumes were estimated after the method of Crooke and Morris (1942), using a visual colorimeter; extracellular fluid volumes were measured by the technique of Lavietes, Bourdillon and Klinghoffer (1936). The results are shown in table V. Judging by the figures on discharge, in 7 out of 8 cases there was on admission a gross reduction in plasma volume, and in 5 out of 7 a lesser, but still considerable, reduction in extracellular fluid volume. It is probably legitimate to take the figures on discharge as a standard, for when they are expressed as per cent. of the body-weight, the average results are as follows:—

| | Plasma volume | Extracellular fluid volume |
|---|---|---|
| | % body-weight | |
| Recovered type I patients .. | 5·1 .. | 20·5 |
| Accepted normal standard .. | 5·0 .. | 20·0 |

### TREATMENT AND PROGRESS

In all cases, liberal fluids by mouth were ordered; the amount aimed at was 16 pints daily. Some patients

Fig. 6




Patients with type I exhaustion: gain in body-weight during treatment.

§ If the reduction ratio is plotted against the plasma-chloride content it is found that all values for type I fall below an arbitrary line, and all values for type II cases fall above it. See fig. 5.

TABLE V—PLASMA AND EXTRACELLULAR FLUID VOLUME IN TYPE I CASES

| Case no. | Plasma vol. (litres) | | Extracellular fluid volume | | % reduction | |
|---|---|---|---|---|---|---|
| | On admission | On discharge | On admission | On discharge | Plasma | Extracellular fluid |
| 27 | 2·2 | 2·4* | .. | .. | 9 | .. |
| 30 | 2·0 | 3·6 | 9·6 | 14·9 | 45 | 35 |
| 42 | 2·0 | 4·1 | 10·4 | 15·0 | 51 | 31 |
| 49 | 2·2 | 3·2 | 12·6 | 13·1 | 32 | 4 |
| 57 | 2·3 | 3·2 | 13·3 | 13·4 | 28 | 1 |
| 61 | 3·2 | 4·2 | 11·0 | 13·5 | 31 | 18 |
| 63 | 1·6 | 3·4 | 10·7 | 16·3 | 53 | 33 |
| 64 | 2·0 | 3·0 | 10·5 | 13·0 | 34 | 19 |

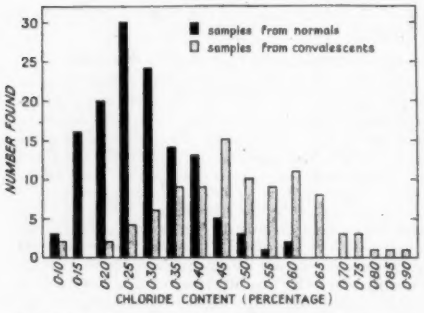
* Discharged before clinically cured.

were given extra salt by mouth, in daily doses of 1 ounce (28 g.). Those who were obviously dehydrated, or who, because of vomiting, could not retain fluids, received intravenous saline. The usual amount given was 4–5 pints of 0·9% in 3 hours; in some cases the first pint was 1·8%. Most patients responded rapidly to treatment. When intravenous saline was given, vomiting and cramps immediately stopped, and in a matter of hours the patients began to look and feel almost well. Progress was followed by daily measurements of weight and BP, and by analysis of blood and urine before discharge. Some curves showing the relation between treatment and gain in weight are shown in fig. 6.

Sufficient data are not available for a valid comparison of those who received salt and those who did not. Some patients, who were not receiving extra salt, improved only slowly or even deteriorated until salt was given (e.g., cases 35, 30 and 42). Others without salt did improve steadily and finally became well, but the course of recovery was slower than in the other group (e.g., case 26). When the patients did begin to gain weight they often did so very rapidly; thus case 42 gained 256 oz. in 3 days, case 30 gained 160 oz. in 2 days, and case 35 gained 100 oz. in one day. The standing and lying BP returned to normal, pari passu with the increase in weight.

In spite of the large fluid intake the urine volumes remained relatively low. A large excess of fluid intake over urine output (6500 c.cm. per day), though the patients were inactive, indicated considerable water retention, reflected by the gains in weight. In those cases receiving only the standard salt ration the chloride content of the urine was still low after 4 days, showing that there was also salt retention. Even when extra salt was given, the return to normal was slow; in 6 out of 7 patients who were given extra salt and from whom blood samples were taken during treatment, the plasma chloride had not yet regained the control level after 6 days.

Fig. 7




Distribution of sweat chloride concentration among control subjects and recovered heat cases.

Blood and urine were obtained from 23 cases of type I exhaustion just before discharge. Hæmoglobin, blood-urea, and plasma-protein concentrations were normal, but in 6 cases the plasma chloride was still low. Of these 6, 4 had not received any extra salt. One of the 6 was readmitted two weeks later with a plasma chloride even lower than before.

The sodium content of the plasma was found to have risen in those cases where it had been measured on admission. The average daily urinary chloride excretion in patients who had been receiving a nominal 28 g.‖ of extra salt daily was 10·14 g.: in those who had not had any extra salt the amount lost in the urine was 4·79 g. Sweat was also collected from these 23 patients; the average chloride concentration was 0·44%; this was significantly higher than the concentration in samples from the control subjects. In general, sweat from all patients suffering from effects of heat was found to contain more chloride than sweat from the controls (fig. 7).

## Discussion

Many previous authors have described cases that agree in most essentials with the syndrome called here heat exhaustion type I. It has often been inferred, but not proved, that these cases are dehydrated. Our findings strongly support this view. The relevant facts may be summarised as follows:—

1. The presence, in a large proportion of cases, of clinical signs of dehydration.
2. The demonstration of considerable reductions in extracellular fluid volume in 5 of the 7 cases in which measurements were made.
3. The relatively low urine output, compared with patients of other types.
4. The large and rapid gains in weight in response to treatment.

As table V shows, the plasma shared in the general reduction of extracellular fluid volume. This fact provides a reasonable explanation for some of the clinical findings. The high diastolic pressure and low pulse-pressure typical of the group are signs of peripheral vasoconstriction. By this means the capacity of the vascular bed would be reduced to compensate for the reduction in blood-volume. In the more severe cases the compensation was only partially successful: although the BP was maintained while lying down, syncope occurred on standing.

Vasoconstriction is likely to be most intense in the regions which normally act as blood reservoirs—the skin and splanchnic area. A reduction in the circulation to the skin implies a low rate of heat transport from the interior of the body to the surface. This may account for the slight but fairly constant heat-retention found in the presence of a cool, normally sweating skin.

Nielsen, Herrington and Winslow (1939) found that the rate of absorption of water from the gut was less in the vertical than in the horizontal position. They suggested that the splanchnic vasoconstriction necessary for maintaining the BP caused impairment of intestinal function. By an extension of this hypothesis, the stomach might also be affected, and this could explain the vomiting, for which no other cause has been found.

One conclusion of practical importance for diagnosis may be drawn from the present results. It is that, in agreement with much recent work, the systolic pressure is an extremely unreliable guide to the state of the peripheral circulation. A reduction in pulse-pressure to a level of 20 mm. Hg or less is probably a more important diagnostic sign.

### BIOCHEMISTRY

The findings in blood and urine showed a gross salt deficiency. The general biochemical picture was of dehydration secondary to lack of salt rather than to lack of water. Besides the low chloride content of the blood and plasma, typical features were the high blood-urea and raised hæmoglobin (cf. Nadal et al. 1941), the diminished extracellular fluid and plasma volume (cf. Russell Elkinton et al. 1942, 1943) and the low U/P ratio (cf. McCance 1936).

One feature of note was the disproportionate fall in the whole-blood chloride as compared with the plasma chloride. An increase in red-cell volume is not alone enough to explain this. Though hæmatocrit measurements could not be made, the hæmoglobin concentrations

‖ The extra salt was issued in tablets once a day for the patients to take as they wished throughout the day. It was not possible to ensure that the full amount was taken; the extra intake was almost certainly less than 28 g.

were measured; there were cases of other types with diminished plasma and whole-blood chloride contents and with hæmoglobin levels just as high, and in these cases the blood chloride was not disproportionately low. This suggests that in type I exhaustion more chloride is lost from inside the cells than from outside. Such sodium estimations as were done indicate that the base lost with the chloride was not entirely sodium.

### ÆTIOLOGY

There was an ample supply of good drinking-water in the area, and the men were encouraged to drink as much and as often as possible. There was no reason for a man to become water-deficient unless he was lazy about drinking. Many men stated that it was a definite task to drink enough water to prevent thirst.

With salt the position was different. The salt intake was limited to an average per man of 31 g. per day; of this about 10 was supplied by the food itself, and half the remainder was used in the cookhouse. The rest was available as table salt or as tablets. In practice most men did not take their full share of salt at table, and did not achieve the maximum possible intake; calculations based on observations made on the control subjects suggest that actual intake was probably about 25 g. per day. It has already been pointed out that this may not be adequate for certain control subjects (group A), when sweating at high rates, who had an average chloride concentration in their sweat of 0·32%. The average chloride concentration in the sweat from type I cases was 0·44%; thus these men would have gone into negative salt balance as soon as their rate of sweating was more than 5½ litres per day, and any man who had a chloride concentration in his sweat of only 0·33% (20 out of 23 type I cases had concentrations higher than this) would become salt-deficient if he was sweating at a rate of more than 7 litres per day. Such rates of sweating certainly did occur in the hot weather.

### PREVENTION

The evidence points to type I heat exhaustion being a salt-deficiency dehydration which develops, when sweating rates are high, in individuals who habitually excrete an unusually high concentration of chloride in their sweat. Prevention of this type of exhaustion therefore should proceed along certain lines:

1. The men should be educated to drink enough to produce at least 30 oz. of urine per day; a low urine volume is a danger signal.
2. If type I heat exhaustion is to be avoided altogether, during the hot weather a daily salt issue of 48 g. should be aimed at. This amount is to cover sweating at 7½ litres per day, a urine loss of 5 g. per day to buffer the effect of any sudden extra loads, and a waste of 6 g. This will protect all men except the very few who secrete sweat containing more than 0·5% NaCl. In actual practice few men would be willing to take such large quantities; and in men with a low concentration of chloride in their sweat extra drinking might be necessary to get rid of the excess salt via the kidneys. Other measures should therefore be adopted.
3. The urine should be tested for chloride at regular intervals. Absent or low chloride in a concentrated urine is an early sign of salt deficiency (McCance 1936).
4. Personnel should be weighed at regular intervals during the hot weather. Any man who shows a persistent loss of body-weight should be instructed to drink more water and take more salt.

*(To be concluded)*

"... The point of view that holds a chest injury to be progressing satisfactorily as long as pleural infection has not developed is no longer tenable. Every consideration is now given to the restoration of full lung function. The change of the focus of attention from the pleural space to the lung stands as one of the important achievements of the military surgeon in this war."—Colonel EDWARD D. CHURCHILL, surgical consultant to the US Army, Mediterranean Theatre.

# TREATMENT OF STAPHYLOCOCCAL INFECTIONS WITH PENICILLIN

## BY INTERMITTENT STERILISATION

JOSEPH W. BIGGER, MD, SCD DUBL., FRCP, FRCPI
LIEUT.-COLONEL RAMC

ALL who have used penicillin in the treatment of staphylococcal infections agree that it is vastly superior to the only other chemotherapeutic substances—some of the sulphonamides—which have any demonstrable action against staphylococci in the living body. Penicillin has undoubtedly saved lives and limbs of patients suffering from staphylococcal infections, but it has not usually cured the disease as it has cured gonorrhœa. It appeared, therefore, to be useful to investigate the reasons for the limited success of penicillin against infections with these bacteria. In some cases, owing either to an inadequate blood-supply or to tissue barriers, penicillin probably does not reach the focus of infection or reaches it only in insufficient amount. But these factors are not considered the only ones which reduce the success of penicillin therapy.

A considerable amount of experimental work was carried out to investigate the action of penicillin on *Staph. pyogenes* in vitro, for only in this way can scientific methods of treatment be devised. Full details of the experiments will be published elsewhere. The objects of this paper are to summarise the main findings, outline a hypothesis based on these and suggest modifications in the methods now in use for the treatment of staphylococcal infections in man.

### BACTERICIDAL ACTION OF PENICILLIN

My results strongly oppose the commonly accepted belief that penicillin is merely bacteriostatic. In view of the weight of opinion and high authority against me, it seems desirable to state the criteria of death of bacteria on which I relied. I was interested in judging whether staphylococci, present in broth to the extent of either many thousands or a few millions per c.cm., which had been exposed to the action of penicillin for periods ranging from a few hours to more than a week, were living or dead.

A loopful of the broth was inoculated on the surface of an agar slope or into a tube of broth and these were incubated. In most cases the period of incubation was only 24 hours, but in a limited number of experiments incubation was continued for 7 days. Controls showed that the amount of penicillin transferred on the loop was insufficient to prevent growth of living cocci. Absence of growth was accepted as establishing the absence of living bacteria in the volume (one loopful or approximately 0·005 c.cm.) examined. This result, which will be referred to as "one-loop sterility," implies that the original bacterial population had been reduced by penicillin to less than 200 cocci per c.cm. When it was desired to determine if complete sterility had been produced, penicillinase was added to the broth in sufficient amount to destroy at least five times the amount of penicillin originally present. The whole was incubated, usually for 3 days, but in some cases for 14 days. Absence of turbidity was accepted as proof of sterility.

Broth containing 250,000 *Staph. pyogenes* per c.cm. was usually reduced to one-loop sterility in less than 18 hours by penicillin in concentrations ranging from 2 units to $\frac{1}{10}$ unit per c.cm. When the concentration was lower than $\frac{1}{10}$ unit per c.cm. the time required to kill this number of bacteria was longer. The lowest concentration found to be effective in producing one-loop sterility with the type of broth, strain of staphylococcus and density of cocci used was $\frac{1}{14}$ unit per c.cm. With higher densities of staphylococci, either higher concentrations of penicillin or longer periods of action or both were required. When the number of staphylococci was 25 million per c.cm., $\frac{1}{4}$ unit per c.cm. of penicillin required about 28 hours and 2 units per c.cm about 20 hours to produce one-loop sterility. With 1 unit per c.cm. of penicillin, one-loop sterility was produced in broth containing 50 million *Staph. pyogenes* in 40 hours and in broth containing 100 million *Staph. pyogenes* in 64 hours.

These results, which are only a few of those obtained, appear to justify the statement that penicillin is bactericidal for *Staph. pyogenes*.

It is sometimes admitted that penicillin has a bactericidal action, but only in concentrations higher than are attainable in the human body. My experiments do not support this view, since I have demonstrated well-marked killing power in concentrations ranging from 1 down to $\frac{1}{32}$ unit per c.cm., while, in the sera of patients undergoing treatment, such concentrations as $\frac{1}{16}$, $\frac{1}{8}$ and $\frac{1}{4}$ unit per c.cm. are often and $\frac{1}{2}$ and 1 unit per c.cm. occasionally recorded.

### VARIATIONS IN STERILISING POWER

Having established the power of penicillin to kill *Staph. pyogenes*, the next part of the investigation dealt with its ability to sterilise, that is, to kill all the bacteria in, a given volume of broth. This problem presented many difficulties, among which was the irregularity of its action.

Four bottles, each containing 50 c.cm. of broth, 1 unit per c.cm. of penicillin and a total of 250 million *Staph. pyogenes*, were incubated. Penicillinase was added to two bottles on the second day and to the other two on the fifth day and incubation was continued for 3 days after the addition. One of each pair of bottles proved to be sterile, the other giving a growth of staphylococci. Similar irregularities and inconsistencies occurred in almost all experiments of this type.

Another problem was the difference in the sterilising power of penicillin against the same total number of staphylococci in different volumes of broth. Sterility was more commonly attained in a small volume of broth than in a large volume. When the total number of staphylococci present was 250 million and the volume of broth was 10 c.cm., 1 unit per c.cm. of penicillin produced sterility within 3 days in 19 out of 45 tests, but only in 6 out of 75 tests when the number of cocci and the concentration of penicillin were the same but the volume of broth was 50 c.cm. When the total number was 10 million cocci, 19 out of 20 tests of 1 unit per c.cm. in 10 c.cm. of broth gave sterility but only 4 out of 15 with the same concentration of penicillin in 50 c.cm. of broth.

The frequent failure to sterilise broth containing staphylococci with penicillin is disappointing, but the disappointment is somewhat mitigated by finding that the attempt failed only by a very narrow margin. Out of 55 tests in which 250 million *Staph. pyogenes* in 50 c.cm. of broth were acted on by 1 unit per c.cm. of penicillin for 72 hours, the number of surviving cocci was less than 11 in 25% of tests, less than 35 in 50% of tests and less than 115 in 67% of tests.

Failure to sterilise cannot be due to the presence of excessive numbers of staphylococci. In most of the tests in which the question was examined, the survivors numbered less than 100 cocci out of the 250 million originally present. If these had survived merely because too many cocci were present to be killed by the amount of penicillin available, sterility should always have been obtained when the initial number of staphylococci was 249 million. But it was not, and even when the initial number was as low as 10 million cocci, sterility was by no means invariably attained.

### PRESENCE OF PERSISTERS

The only hypothesis which seems to explain the occurrence of a small number of survivors out of the millions of cocci originally present is that these differ from the majority of their fellows in that they are capable of surviving a concentration of penicillin which, in the time of action allowed, kills the others.

These abnormal cocci are few in numbers—rarely more than 1 per million of those inoculated. If the inoculum is large, some of these forms are certain to be present and sterility will not be attained in any test. When the inoculum is smaller, abnormal forms will be present in some test volumes but not in others. They are distributed at random among the normal cocci, which explains the chance distribution of test volumes which are not sterilised. As a matter of convenience, these abnormal cocci have been termed "persisters," to denote their power of surviving in the presence of sufficient penicillin to be lethal for the normal forms. The term "resister" has been avoided, because this implies, in the case of bacteria, special qualities which the abnormal cocci may or may not possess.

Persisters appear to be present in very small numbers in the broth culture used as inoculum. When broth in 10 c.cm. volumes was investigated, the number of tubes remaining unsterilised by penicillin was roughly proportional to the number of cocci inoculated, and, it may therefore be presumed, to the number of persisters present in the inoculum. When 50 c.cm. volumes were examined, the number of non-sterile bottles decreased as the number of staphylococci inoculated decreased, but the decreases were not proportional. It was clear that several factors were operating. One was the number of staphylococci originally introduced, but this factor tended to be overshadowed by others. Ultimately it was found that some cocci in the inoculum were predestined to be persisters, but that the persister phase could be induced in normal cocci by contact with their new environment. Persisters appear rapidly when a broth culture is added to cold broth, and the longer the period of chilling the larger the number of persisters produced. Another factor is dispersal. More persisters are produced when a given number of staphylococci are introduced into a large volume of broth than when the volume of broth is small.

These findings explain why sterility is more commonly produced in 10 c.cm. volumes of broth than in 50 c.cm. volumes, both inoculated with the same number of staphylococci, and also why the sterility-rate is proportional to the number of staphylococci introduced in the small volume but not in the large. In small volumes the persisters are almost entirely those present as persisters in the inoculum. Few new persisters develop as the dilution of the cocci is low and the period elapsing before body temperature is reached in the incubator is short. In large volumes the dilution is higher and the period of chilling longer than in small volumes, and, in consequence, in these both primary persisters and newly developed persisters are present.

In most of the experiments on sterilisation, the period of action of penicillin was 3 days. In one, however, 2 units per c.cm. of penicillin was allowed to act for 11 days. Two out of 10 bottles were not sterilised. It is probable that, by greatly prolonging the time of action of penicillin, the sterility-rate may be increased, but even with such a high concentration as 2 units per c.cm., and such long period of action as 11 days, some persisters survive.

Most of the experiments were performed with *Staph. pyogenes*, strain H, the strain used in assaying penicillin. Eight other strains were found to behave in much the same way when acted upon by penicillin. Similar results were also obtained when serum was used as the culture medium instead of broth.

### NATURE OF PERSISTERS

Three theories of the nature of persisters must be considered. Persisters may be:—

1. Cocci with highest natural resistance to penicillin.
2. Cocci which have acquired resistance to penicillin.
3. Cocci with no greater resistance to penicillin than normal but which happen to be, when exposed to it, in a phase in which they are insusceptible to its action.

A weighty argument against the first theory is that 1 unit of penicillin per c.cm. kills 99·96% of 250,000 cocci in 6 hours. It is improbable that the curve of individual resistance to penicillin would be so prolonged as to permit, within the limits of normal variation, cocci capable of surviving this concentration of penicillin for 72 hours and still less for 11 days.

To acquire resistance to penicillin, long exposure through many generations to gradually increasing concentrations is required. In the experiments under consideration, the cocci were suddenly exposed to relatively high concentrations and no time was permitted for growth, which appears always to be necessary for adaptation to take place.

If persisters had an abnormally high resistance, either natural or acquired, to penicillin, it is probable that their descendants would also possess abnormally high resistance. The descendants of a number of persisters which had survived contact with 1 unit per c.cm. penicillin for 3–5 days were found to be killed by $\frac{1}{4}$ unit per c.cm. within 46 hours and to have no greater tendency than normal forms to produce persisters.

For these reasons, it is improbable that persisters are, in the sense in which the term is usually applied to bacteria, resistant. How then is their survival to be explained? The only theory of the mode of action of penicillin on bacteria to gain general acceptance is based on Gardner's observation[1] that when bacteria are exposed to weak concentrations of penicillin they increase in size but do not divide. The theory is that penicillin acts bacteriostatically by preventing division. If it be accepted, as indeed it must, that penicillin is bactericidal, it is not unreasonable to assume that it acts on bacteria at the time of division and that it not merely prevents division but actually kills. It was, therefore, important to determine if only bacteria which are about to divide are susceptible to the action of penicillin. Three experiments were performed which give reasonable support to the suggestion that penicillin is without effect on non-dividing bacteria.

1. Penicillin was titrated in broth in triplicate. One set of tubes was kept at 37° C., one set at air temperature and one at 4° C., all for 23 hours. One loop sterility in the 37° tubes was given by from 1 unit to $\frac{1}{16}$ unit per c.cm. Even 1 unit per c.cm. in the tubes kept at air temperature failed to attain this standard, 14 colonies resulting from 1 loopful of the broth. The same concentration at 4° gave an extensive growth from 1 loopful.
2. Staphylococci die rapidly in distilled water but the addition of 1 part of broth to 800 parts of distilled water gives a medium in which the number of staphylococci remains practically constant at 37° for 24 hours, and in which, therefore, it may be presumed that little multiplication is occurring. One unit per c.cm. of penicillin in this medium, acting for 18 hours at 37°, caused only a slight reduction in the number of living staphylococci, while $\frac{1}{4}$ unit per c.cm. did not appreciably reduce the number.
3. Boric acid in low concentration is bacteriostatic. When 1 unit per c.cm. of penicillin acted for 24 hours on staphylococci in broth containing a small amount of boric acid, the number of staphylococci was reduced to about a third. With lower concentrations there was no appreciable reduction.

These three experiments suggest that penicillin does not injure staphylococci which are not dividing and give a considerable degree of probability to the hypothesis that persisters are cocci which survive contact with penicillin because they are in a dormant, non-dividing phase. Further support is given to the theory by the fact that, when 1 unit per c.cm. of penicillin had acted on staphylococci in broth for 72 hours and was then inactivated by the addition of penicillinase, culture being continued, not all the persisters multiplied at once. In 64% of tests turbidity was present after 24 hours' incubation, and in 29% turbidity was first observed after incubation had continued for 48 hours. In the remaining tests, turbidity was delayed for 3 or more days. In one test it was first observed on the ninth day. This shows that the condition of dormancy may persist for a considerable time after penicillin has been destroyed.

Attention may here be called to the important practical lessons which are to be learned from the three experiments described above. These are that, in order to obtain the maximum effect of penicillin on bacteria, temperature should approximate to that of the body, action must take place in a nutrient medium, and admixture with other antiseptics must be avoided unless (as is true of the sulphonamides) antagonism does not occur.

We may now summarise what we know, what we have reasonable experimental evidence for believing and what we surmise about persisters.

1. Despite the well-marked bactericidal power of penicillin, attempts to sterilise broth containing *Staph. pyogenes* often fail because, among the millions of cocci present, there are a few which are insensitive to penicillin. These I call "persisters."
2. Persisters represent a small, but not constant, proportion of the staphylococci initially present.
3. Some cocci are in the persister phase when inoculated into fresh medium, but the condition is induced in others by their new environment.
4. There is no evidence that the production of persisters is due to penicillin, although they may be produced in its presence.
5. Persisters are not killed by concentrations of penicillin sufficiently high to kill ordinary forms. For them penicillin is bacteriostatic.
6. Persisters are believed to be insensitive to penicillin because they are in a dormant, non-dividing phase, similar to that of bacteria in the lag phase of the growth curve, and because penicillin kills bacteria only when they are dividing or about to divide.
7. Persisters are individually insensitive to penicillin but their descendants are no more resistant than are normal cocci.
8. When penicillin is destroyed, the majority of persisters develop normally and divide quite quickly, but in a few the dormant phase persists for several days.
9. Penicillin is believed to prolong the dormant phase, but not indefinitely.
10. It is believed that, despite the presence of penicillin, the biological urge to multiply may ultimately force persisters to undergo the processes preparatory to division with the result that they become susceptible to the action of penicillin and are killed by it.

So far we have considered only experiments in vitro, but it is believed that these are of importance because persisters are no mere laboratory artefacts. Clinical evidence strongly suggests that they also occur in the body. Every bacteriologist with experience of the control of penicillin treatment has probably examined specimens of pus from lesions treated locally with penicillin which on direct plating yield no growth, but which after treatment with penicillinase give extensive growths of the causative bacteria. If cultures of these organisms are tested, they will usually be found just as sensitive to the action of penicillin and just as easily killed by it as was the strain isolated before treatment was commenced. Such organisms are persisters and not resisters.

## CLINICAL APPLICATIONS

We must now attempt to apply what we have learned in the laboratory to clinical practice.

Treatment of a case of staphylococcal osteomyelitis with penicillin is usually continued for 7 or 8 days. During the first few days after the cessation of treatment it appears possible that the infection has been eliminated, but then, in most cases, the disease again becomes active. The probable explanation of this is the survival in the focus of infection of persisters which, within a few days of the withdrawal of penicillin, begin to multiply. There is fairly good evidence to suggest that persisters occur more commonly in the body of a patient and there tend to remain dormant for longer periods than in broth cultures.

So long as penicillin treatment is continued the persisters will be held in check. If the supply does not fail and if the patient does not revolt the invading cocci will ultimately be eliminated, partly either by death in the persister phase or by the action of penicillin on cocci which despite its presence have begun to divide, and partly by the action of polymorphonuclear leucocytes. Such evidence as is available suggests that several weeks of continuous treatment would be required to sterilise the body of the patient by this method.

An alternative, which might be worthy of trial, is to stop penicillin after 4 days, during which time all non-persisters should have been killed, and to substitute sulphonamide therapy for it. Sulphathiazole and sulphadiazine have considerable bacteriostatic power against staphylococci in vitro. Their limited value in the treatment of staphylococcal infections is probably due to their inability to cope with large numbers of bacteria, but they might be capable of controlling the limited number of persisters remaining after 4 days of penicillin therapy until these could be disposed of by leucocytes.

Both these methods rely mainly on the power of polymorphonuclear leucocytes to eliminate staphylococci, but the extreme chronicity of some types of staphylococcal infection, particularly when bone is involved, and the lack of complete success of penicillin and sulphonamide therapy, as generally administered, urge

1. Gardner, A. D. *Nature, Lond.* 1940, **146**, 837.

extreme caution in predicting a complete cure of the disease by either.

It is believed that a more logical method of treatment based on what we have learned about the behaviour of staphylococci in the presence of penicillin, can be devised. The method suggested is fractional or intermittent sterilisation, essentially similar to that employed to kill spores in culture media. The method consists in alteration of periods of treatment with periods of absence of treatment. During treatment, all cocci in a susceptible phase should be killed by penicillin. During periods of absence of treatment, persisters should commence to divide and so become susceptible to penicillin. But, since the persister phase may be of long duration, even in the absence of penicillin, several alternations of treatment and absence of treatment would be required for the complete elimination of staphylococci from the body.

The details of treatment must depend on clinical trials, but it is suggested that the first treatment should extend to 4 days and subsequent treatments to 2. It is difficult to decide on the optimum duration of intermissions. If too short, only a few persisters may have resumed their activities. If too long, a fresh infection may have begun.

The following scheme is tentatively suggested:—

| | | | |
|---|---|---|---|
| 1st treatment | 4 days | 3rd intermission | 2 days |
| 1st intermission | 1 day | 4th treatment | 2 days |
| 2nd treatment | 2 days | 4th intermission | 3 days |
| 2nd intermission | 1 day | 5th treatment | 2 days |
| 3rd treatment | 2 days | | |

This course covers a period of 19 days, during which treatment is given for 12 days. Apart from the therapeutic value which they are believed to have, the intermissions will be welcomed by the patient.

Next we must consider dosage and method of administration of penicillin. Both laboratory and clinical experience suggest that the now almost conventional 120,000 units per 24 hours is inadequate against staphylococcal infections. The aim should, I believe, be maintenance of ½–1 unit per c.cm. in the patient's serum, which corresponds to complete inhibition of the Oxford staphylococcus by the patient's serum in a dilution of ½ to 1/10. To achieve this 400,000 units per 24 hours should suffice.

In suggesting such high dosage and penicillin level in the serum, I have in mind not so much cocci in the blood-stream, which should be controlled and mastered by a much smaller dose, but the cocci in the tissues, some of which may have poor blood-supplies. Several experiments demonstrated the value of high concentrations of penicillin in killing staphylococci in broth.

Continuous intramuscular injection is strongly recommended as the method of administration. The dose of penicillin (sodium salt) decided upon—my suggestion is 400,000 units—should be dissolved in 100 c.cm. of saline and the rate of dropping should be so regulated that this amount is administered in 24 hours. Fluid intake by mouth should be restricted in the hope that this will reduce the rate of excretion of penicillin. In order to attain a high concentration of penicillin in the blood-stream as promptly as possible, an intramuscular injection of 30,000 units should be given immediately before the drip is started in each treatment period.

Some parts of the body, notably the central nervous system and pleural cavities, are relatively or absolutely inaccessible to penicillin present in the blood-stream. For these, as also for lesions of bone and abscesses wherever situated, we must supplement general by local treatment, administered by appropriate routes and methods. Such local treatment should be administered coincidentally with the general and the same intermission should be observed.

Finally we must not, because we are using penicillin, neglect the assistance of surgery. All collections of pus, which constitute reservoirs of persisters, should be evacuated as completely as possible. Every effort should be made to persuade the surgeon to use closed methods and to avoid open drains. When working with penicillin even surgeons must learn new techniques.

It must be emphasised that the scheme of treatment outlined is in no way dependent on the truth of the theory that penicillin kills bacteria only when they are about to divide, and that persisters are bacteria which survive because they are not, when first exposed to penicillin, about to divide. The treatment is based on the finding that, while the great majority of staphylococci are killed by penicillin in concentrations easily attainable in the body, a few cocci survive contact with high concentrations for long periods, but, when freed from it, they multiply and their descendants are easily killed by it.

The experimental work on which the suggestion for treatment by the intermittent sterilisation method are based dealt only with *Staph. pyogenes*, but it is unlikely that this is the only organism to produce persisters. Some, such as the gonococcus, probably do so rarely, but there is good clinical evidence that *Strep. pyogenes* and the penicillin-sensitive non-hæmolytic streptococci responsible for some cases of subacute bacterial endocarditis do so almost invariably. Treatment of such infections by the intermittent sterilisation method, therefore, offers increased prospects of cure.

It is claimed that this method of treatment, which is based on laboratory experiments, is worthy of clinical trial in all infections due to penicillin-sensitive bacteria which are not cured by a single course of treatment with penicillin. It is believed that, when it is generally appreciated that penicillin is bactericidal and when treatment is so designed as to exploit this property, the success of penicillin therapy will become more commensurate with its potentialities.

SUMMARY

Penicillin is bactericidal for *Staph. pyogenes*.

Failure to sterilise broth containing *Staph. pyogenes* is due to the survival of a small number of staphylococci called persisters.

It is believed that persisters are insensitive to penicillin because they are temporarily in a non-dividing phase and because penicillin kills only bacteria which are about to divide.

Unlike resistant strains, descendants of persisters are easily killed by penicillin.

Penicillin fails to cure staphylococcal infections in the body because some of the cocci are in the persister phase.

A scheme of treatment in which penicillin is alternately administered and withheld is suggested, in the hope that bacteria in the persister phase will divide during an intermission and be killed by penicillin when its administration is recommenced.

# OVARIAN FIBROMA

## WITH ASCITES AND HYDROTHORAX

## (MEIGS'S SYNDROME)

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THE occasional association of benign ovarian fibromas with ascites and hydrothorax was first recognised as a syndrome by Meigs and Cass in 1937, though Griffith and Williamson (1906), Owen (1923) and McIlrath (1937) had mentioned the occurrence of hydrothorax in this connexion. Since 1937 many further cases have been reported. In 1943 Meigs, Armstrong and Hamilton collected 27 fully documented cases, and 6 more were reported in the discussion which followed their paper. Three others have since been published in America (Jones 1943, Herrick et al. 1943, Keleman 1944), bringing the total to 38.

As far as we can ascertain only 4 cases have been described in this country, the first by Cullingworth (1879), the next, to which Thompson (1943) has drawn attention, by Lawson Tait (1892), the third by Borg (1941) and the fourth by Gild (1943).[1] It is therefore natural that the condition should be little known in Britain, yet it deserves wide recognition because the patient may come first under the care of either physician or surgeon, depending on her presenting symptoms, and though the condition responds completely to surgical treatment he may well regard it as malignant and inoperable if he

1. Since this paper was written 2 more cases have been reported in England, by Clay, A. C., Johnston, R. N. and Samson, L. (*Brit. med. J.* 1944, ii, 113).

is unfamiliar with it. Furthermore, if it is recognised a patient may be spared many unnecessary and complicated investigations, and the dangers and subsequent disadvantages of a radical operation, such as was performed in our case. Simple removal of the fibroma is all that is necessary.

## CASE-REPORT

A married woman of 38, nulliparous, was admitted to hospital on Sept. 7, 1943, complaining of shortness of breath on exertion and pains in the back. In 1941 she first noticed severe pain across the back, which was so bad she could not get out of bed. There was some improvement with liniment and medicine, though since that time it had continued on and off. In February, 1943, she began to have pain in the right knee which gradually became more severe and needed the care of a doctor. She was first seen on March 29 when the right knee showed a considerable effusion into the joint but there were full movements in it, and nothing else abnormal. An X ray showed no bony disease. Wassermann and Kahn reactions were negative. The knee remained painful and swollen for some weeks but suddenly became normal in 2 days, after a cycle ride. Almost immediately after this she had an attack of shortness of breath, followed by tightness in the chest which she described as "asthma." These attacks of shortness of breath continued intermittently for 8 weeks but then disappeared, though from the time of the first attack until her operation she noticed shortness of breath on exertion. By about August she thought her abdomen was "getting hard." Her periods, up to 7–8 months previously, had been normal, lasting 3–4 days every 28 days. They had then become irregular, lasting 3–4 days every two months, and the last monthly period was on May 20, 1943.

*On admission*, Sept. 7, she showed slight wasting, but no œdema of feet. Diminished movement and stony dullness on the right side of the chest extending from the base to the axilla, with diminished air-entry and a few distant râles. The left side of the chest was clear. X rays showed a large pleural effusion at the right base, and an area of consolidation, which was thought to be postpneumonic, though neoplasm could not be excluded. There was a hard mobile mass rising out of the pelvis reaching three-quarters of the way to the umbilicus which per vaginam seemed very like a fibroid. It could not, however, be divorced from the uterus and the question of pregnancy was not entirely ruled out. There was evidence of some free fluid in the abdomen. On Sept. 9 a Friedmann's pregnancy test was negative and X rays excluded the presence of fœtal parts, but showed calcified glands to right of the 5th lumbar vertebra. On Sept. 10 the right side of the chest was tapped and a large quantity of clear straw-coloured fluid drawn off. The deposit contained a few polymorphs and lymphocytes. No organisms or malignant cells were seen, and the culture was sterile, Tubercle was excluded by guineapig inoculation. On Sept. 20 X rays showed no change in the chest. More pleural fluid was aspirated, and gave the same results on examination. Bronchoscopy on Sept. 24 showed nothing abnormal. On Sept. 30 the abdomen was explored; some clear straw-coloured fluid escaped, and the pelvic mass was found to be a solid white hard tumour of the left ovary, 6 in. by 5 in. Nothing else abnormal was found. A subtotal hysterectomy was performed with removal of the solid tumour and both ovaries. The tumour turned out to be a fibromyxoma with no evidence of malignancy.

The patient made an uneventful recovery. X rays on Oct. 7, 1943, showed no effusion in the chest but the pleura at the right base was thickened. She was discharged on Oct. 20 and has remained well except that she has lost all sexual desire, has put on weight and has other symptoms referable to an early menopause.

## ANALYSIS OF FINDINGS

*Presenting symptoms.*—In most published cases the presenting symptoms are referable to chest and abdomen, and a combination of shortness of breath or pain in the chest with enlargement of the abdomen and discomfort or pressure symptoms should bring the syndrome to mind. Less often the symptoms are referable to the abdomen alone, and occasionally to the chest alone. Slight continuous uterine hæmorrhage, menorrhagia, normal menstruation and amenorrhœa have all been reported, amenorrhœa being the commonest.

*Physical signs.*—Apart from the usual signs relating to hydrothorax and ascites, in nearly all cases the tumour can be palpated easily. Tumours vary considerably in size, sometimes being larger than an adult head. Occasionally ascites conceals the underlying tumour. The fibroma itself may be associated with one or other ovary, or be bilateral; it is therefore essential to scrutinise the apparently healthy ovary carefully; but there is no need to remove it unless it appears abnormal, since the condition resolves completely with removal of the offending fibroma alone. Hydrothorax is commonly purely right-sided, often bilateral, and only rarely left-sided. The side on which the fluid in the chest develops does not seem to be related to the side of the abdominal lesion; all combinations have occurred. Cachexia is often present, especially in cases with a long history. Œdema of the feet has been noted in at least 8 cases. Whether the synovitis in the right knee in our case was due to the presence of the ovarian tumour or not is difficult to say. The facts that it developed with no other obvious cause, about 7 months before admission to hospital, and that it was followed by the shortness of breath which heralded the onset of the hydrothorax, makes it likely that it was part of the syndrome. We found no other reports of synovitis associated with the syndrome.

*Other findings.*—Pleural fluid has been examined in many instances and in no case has the tubercle bacillus been cultured or demonstrated by inoculation into guineapigs. A few lymphocytes are commonly found in the fluid, but never any malignant cells. Specific gravity and protein content suggest that the fluid is a transudate, not an exudate. The abdominal fluid is similar in nature to the pleural fluid, as confirmed by laboratory tests (Meigs 1934), X rays, while confirming the presence of fluid, have never revealed active tubercle or any other condition likely to account for fluid in the pleural cavities. In Harris and Meyer's (1941) case the tentative diagnosis of a uterine fibroid was made, and an intensive course of X-ray therapy given, without benefit. In the few cases where the blood chemistry was systematically examined no gross abnormality was found and the plasma proteins were within normal limits. Electrocardiograms, in the few cases where they have been done, have usually shown some abnormalities, though in at least one case (Glass and Goldsmith 1942) the original diagnosis of congestive heart-failure was later considered wrong, in view of the response to surgical treatment.

*Differential diagnosis.*—It is essential that the diagnosis of malignancy should not be final until this syndrome has received full consideration, and in all doubtful cases an exploratory laparotomy should be performed. Lawson Tait (1892) advocated exploration of the abdomen in all cases of ascites and hydrothorax, lest a fibroma or other operable tumour might be missed. A few other cases have been reported where hydrothorax (not associated with secondaries) and ascites have been associated with a pelvic neoplasm; all responded completely to removal of the tumour. These include fibroid of uterus (Salmon 1934), papillary cystadenocarcinoma of the ovary (Schenck 1934), benign ovarian cyst (Dannreuther 1937), and cystadenoma of the ovary (MacFee 1939). Krukenburg's tumours of the ovary should also be borne in mind in the differential diagnosis. They are almost invariably associated with ascites and a primary lesion in the gastro-intestinal tract, usually a carcinoma of the stomach. Exploratory laparotomy will, however, rule them out, as also it will exclude cystadenoma of the ovary with secondaries in the pleura—another diagnosis that has been wrongly made in the past.

## DISCUSSION

Ascites associated with fibroma of the ovary has long been recognised, and has been estimated to develop in association with 40–75% of all such fibromas (Peterson 1902, Meigs et al. 1943); indeed, any large benign pelvic tumour may cause ascites. Many theories have been put forward to account for the ascites and the less common hydrothorax, of which the more likely are:

1. Small congenital openings in the diaphragm allow direct passage of fluid from the abdomen.
2. It is an example of Selye's "alarm reaction."
3. The fluid enters the pleural cavities via the diaphragmatic lymphatics.
4. There is mechanical obstruction of the venous or lymphatic outflow of the thorax.

5. The pleural and ascitic fluid are due to congestive heart-failure.
6. Hypoproteinæmia is responsible.
7. Torsion of the pedicle of the tumour leads to outpouring of ascitic fluid.

In his first article Meigs (1937) inclined to the "alarm reaction," Selye found that repeated minor traumata to mice, especially if applied to the peritoneal cavity, lead to a building up of resistance; later, this resistance is lost, and the mice show a decline in urinary excretion, with retention of fluid, and ascites with hydrothorax followed by death. Meigs and others (1943) have still found no satisfactory explanation of the hydrothorax. Their findings may be briefly enumerated:

1. A direct congenital pleuroperitoneal hiatus is very unlikely to be present, since subjects having such a communication between chest and abdomen generally die in infancy. Meigs found no X-ray evidence of such a communication between the cavities in two cases of the syndrome. In one case he injected air into the abdominal cavity, in the other into the pleural cavity; in both cases, even with tilting, it was impossible to demonstrate that air had passed through the diaphragm.

2. Selye's alarm reaction has not been proven experimentally.

3. A communication between abdomen and thorax via the diaphragmatic lymphatics is more likely, and Meigs and his colleagues have conducted experiments in 2 cases. They injected 2 c.cm. of sterile Indian ink into the abdomen, and later tapped the chest. In both cases the cells in the chest fluid showed the same concentration of carbon granules as those in the abdomen. Examination of the blood shortly after the injection of the ink showed that the granules did not arrive in the pleural fluid by way of the blood-stream. Furthermore, the abdominal and thoracic fluids were identical in protein content. This work strongly suggests that at any rate some of the fluid from the abdomen reaches the chest via the diaphragmatic lymphatics, though the major problem of why fluid should be present in the abdomen remains unsolved.

Bomze and Kirschbaum (1940) considered that both their cases were due to congestive heart-failure and put this theory forward as the cause in all cases. The evidence in their cases does not seem conclusive and we feel that the complete recovery of all cases after operation is alone sufficient to disprove it. Hypoproteinæmia can be excluded, since in those cases where the blood was suitably examined it was found to be normal.

Our own inclination is towards mechanical obstruction of the venous return to the heart. In the right azygos vein valves are often absent or imperfect and those in the upper portion are inefficient (Cunningham 1931, Spalteholz 1933); and in cases of obstruction of the inferior vena cava, the azygos system, draining as it does into the superior vena cava, is able to take over in part the return of blood to the heart; finally, the azygos system varies greatly. In the cases above discussed five points are relevant. First, at the autopsy of Borg's case the azygos vein was twice as wide as the abdominal aorta. Secondly, in at least 8 cases œdema of the feet has been noted and in one case œdema of the abdominal wall as well; possibly these conditions have occurred in others but have not been recorded. Thirdly, the hydrothorax is nearly four times more common on the right than the left. Fourthly, in several instances the tumour has been recorded as being wedged tightly into the pelvis, and with the sizes of the tumours given together with their hard consistency it is likely that this has happened more often than has been stated. Lastly, the presence of fluid in the right knee in our own case.

From these considerations it seems certain that pressure on the inferior vena cava in its lower part must occur to a greater or less extent with a consequent increased load to be carried by the azygos system, leading in its turn to dilatation, and with the inefficient valves in its upper part to back pressure and transudate into the right pleural cavity. That œdema of the feet does not occur in all cases is difficult to account for on this theory, but presumably in these cases the inferior vena cava and azygos system between them are sufficiently patent to deal with the venous return from the lower limbs.

Again, the common variations in the anatomy of the azygos vein may well account for the occasional development of a left hydrothorax alone. The vena azygos may be formed on the left side, and such is a normal arrangement in some mammals; the hemiazygos vein may be a continuous trunk and open into the left innominate vein (Cunningham 1931). Meigs and Cass (1937) do not consider these facts when rejecting the possibility of the azygos system playing a part in the causation.

Finally, while we consider this theory the most likely one yet put forward, explaining as it does the occasional hydrothorax found in other pelvic tumours, it must be admitted that no theory has yet been proven, and further investigations are required, notably a study of the leg-lung circulation-time before and after operation, detailed necropsies if occasions arise, and research into the incidence of hydrothorax in other conditions causing ascites.

SUMMARY

Some 38 cases with fibroma of the ovary, ascites and hydrothorax are reviewed, one being a new case.

The differential diagnosis is discussed, with particular reference to the possibility of withholding operation because of a mistaken diagnosis of malignancy, and the risks of performing an unnecessary radical operation.

Fibroma of the ovary should be considered in all women complaining of shortness of breath or pain in the chest with enlargement of the abdomen and pressure symptoms.

The possible causes of the abdominal and pleural effusions are discussed. The most likely explanation is mechanical obstruction to the venous return within the abdomen.

We wish to thank Mr. Victor Lack for his coöperation.

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## HEREDITARY FAMILIAL TELANGIECTASIS WITH EPISTAXIS AND MIGRAINE

A. M. G. CAMPBELL, D M OXFD, M R C P
SQUADRON-LEADER RAF

THE following case of hereditary familial telangiectasis presents some unusual features. This somewhat rare disease was first accurately described by Osler,[1] who reported numerous telangiectases on the skin and mucous membranes in a family in which 7 members were affected. The telangiectases are usually first noted in adolescence and may increase in number as age advances. The capillaries in the nævi are extremely fragile, hence the tendency to bleed. Osler stresses the severity of the condition and the danger of bleeding to death. He also states that trauma is the precipitating factor producing hæmorrhage. Hurst and Plummer[2] have summarised the known facts and mention 5 fatal cases. Figi and Watkins[3] have recently described 20 cases seen over a period of twenty years at the Mayo Clinic. They mention that on the whole life is not seriously shortened by

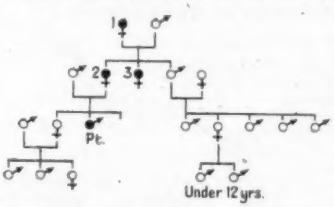
1. Osler, W. *Johns Hopk. Hosp. Bull.* 1901, **12**, 333; *Quart. J. Med.* 1907, **1**, 53. See also Parkes Weber, F. *Lancet*, 1907, II, 160.
2. Hurst, A. F. and Plummer, N. S. *Guy's Hosp. Rep.* 1932, **82**, 81.
3. Figi, F. A. and Watkins, C. H. *Proc. Mayo Clin.* 1943, **18**, 418.

this disease and add that none of their cases were blood relations. They found hæmorrhages might come on spontaneously whilst lying in bed, and consider electrocoagulation the best form of therapy.

### CASE-RECORD

A cadet aged 23 attended neurological outpatients in an RAF general hospital complaining of bouts of severe headache with blurring of vision, flashes of light, typical fortification spectra and epistaxis. A history of telangiectasis was obtained in 3 other members of this family (see figure).

The patient was perfectly fit until the age of 14 when he began to suffer from severe epistaxis, at times crippling; after several bouts he had to retire to bed to recover. The bleeding was difficult to control and twice had been so severe as nearly to warrant blood-transfusion. Bleeding took place once weekly and was always preceded by a severe attack of migraine, which was relieved by the epistaxis. The migrainous pain was over the right eye and was accompanied by blurring of vision and fortification spectra and telescopic vision. The attacks lasted for ½–5 hours and invariably terminated in epistaxis with relief of pain. At the age of 16 two other nævi appeared on the upper lip and gradually more appeared on the trunk. During these years the patient found he was forced to curtail his activities owing to loss of blood—e.g., he had to give up swimming and running. At the age of 19 he had a sharp attack of malaria in Costa Rica. He began work in an aircraft factory at the age of 21, in 1939, and in 1941 joined the RAF to fly as a pilot from patriotic motives. He found work at his initial training wing difficult and had reported sick and been sent for a specialist's opinion as to his fitness for service. He was a thin pale youth weighing about 9 st. Nævi were evident on the upper lip and the nasal mucosa, and there were several on the trunk. The only troublesome ones were those in the nose and on the upper lip. Clinical examination of other systems did not reveal any abnormality. The spleen was not palpable. Blood-count: red cells 4,100,000 per c.mm.; Hb. 65% (Sahli); white cells 8500 per c.mm., differential count normal; bleeding time normal; clotting time normal.




*Patient's family tree:* 1. Patient's grandmother; died aged 70. 2. Patient's mother; alive, aged 57, semi-invalid. 3. Patient's aunt; died after operation for carcinoma mammæ, aged 60.

A severe epistaxis occurred in the ward and lasted 30 minutes. The inflated finger-stall, as described by Hurst and Plummer, was effective in controlling the bleeding.

A test-meal showed no gastric bleeding and the stools contained no occult blood. The urine was normal. The migrainous attacks failed to respond to ergotamine or phenobarbitone. Since there is only symptomatic treatment for this condition he was discharged from the Service with the advice to return to his civilian occupation in an aircraft works, to rest if the bleeding became severe, and to use the finger-stall.

The case is of interest in that it was associated with migraine and the bleeding came on with the vaso-dilatation of the nasal mucosa which accompanied the migrainous attack. Spontaneous bleeding is not common in this disease, as the fragile capillaries in the cutaneous nævi tend to bleed only when knocked. No previous reference to this association could be found in the literature.

The presence of an intracerebral telangiectasis might possibly be a cause of the migrainous attacks but this seemed somewhat unlikely. There is no way of proving the point and examination of the central nervous system showed no abnormality.

Though 3 other members of his family were affected, it had not seriously affected their longevity, and a study of the family does not confirm the serious prognosis which Osler gave the disease, thus agreeing with the views of Figi and Watkins.

My thanks are due to the DGMS, RAF, for permission to publish this paper.

## CONGENITAL SYPHILIS WITH OBSCURE INITIAL SIGNS

C. PAGET LAPAGE, MD, FRCP
PHYSICIAN, ROYAL MANCHESTER CHILDREN'S HOSPITAL

THERE was an increase in the number of cases of congenital syphilis after the last war and there is a likelihood of a similar increase now. Nabarro (*Lancet*, 1943, i, 291) draws attention to unrecognised congenital syphilis and gives many figures which show how dangerous the disease is. The word "unrecognised" in his title should be noted, and it is with regard to that aspect of the problem that the following six cases seen recently in infants are worthy of record.

In most of these cases the classical signs—rash round the anus and snuffles—were absent, the mothers were apparently healthy during pregnancy and the infants usually seemed normal at birth. It is also interesting that three cases out of the six had initial paralytic signs. Paternal occupation was half civilian and half Army but the number of cases is too small for this to have any scientific significance.

CASE 1.—Age 6/52; weight at birth 7½ lb. Father in the Army. Brought with a diagnosis of Erb's paralysis because he was not moving his arms, but the mother said he had never done so. The fontanelle was open; X ray for rickets negative. Had been vomiting for a day. Slight albuminuria. The bilateral paresis was suspicious, and a Wassermann on cerebrospinal fluid was positive. Result: done well on sulpharsphenamine ('Sulfarsenol.').

CASE 2.—Age 4/12; weight at birth 8 lb. Father a workman. Developed a napkin rash and bronchitis. Cross, under-nourished, with tendency to snuffles. Skin dry and unhealthy. Wassermann positive. Treated with sulpharsphenamine; improved on discharge.

CASE 3.—Age 4/52. Father in the Army. Brother died at age of 3 weeks; erythroblastosis suggested. Patient was admitted for the blood tests. Developed a macular rash on arms and legs. Skin of the soles and palms was dry. Wassermann positive. Treated with sulpharsphenamine. Died.

CASE 4.—Age 2/52. Father a navvy. Brought in as case of double Erb's paralysis. Child had head-retraction and neck-rigidity, a purulent nasal discharge and blepharitis; considerable wasting. There was a possibility of cerebral hæmorrhage. Wassermann positive, and child did well on sulpharsphenamine at first but died later.

CASE 5.—Age 13/52; weight at birth 5 lb. 15 oz. Father a fitter. Mother well during pregnancy. Negative family history. Pain (abdominal) at 4 weeks; stools unaltered. Was then found to be unable to move arms and legs, but could move head; marasmic, snuffles, dry and cracked lips, depressed bridge of nose and hydrocephalic appearance with bulging fontanelle; scalp veins distended and liver enlarged. Considerable deformity of epiphyses of upper limbs; X ray showed decided erosion suggesting congenital syphilis. Pain on movement; desquamation of arms and feet; slightly red buttocks and balanitis. Wassermann positive. Did well at first on 'Sulphostab,' but died later with indefinite meningeal signs.

CASE 6.—Age 2 years. Well nourished. Father in Navy. Normal infancy except for squinting at 3 weeks. Bilateral internal strabismus and neck-rigidity. Meningo-encephalitis or brain tumour suspected. There was slight papilloedema. Unable to sit up or move limbs but answered if spoken to. Appeared to be blind but this appearance was probably due to ocular palsy. Lumbar puncture: colourless fluid under increased pressure; protein 200 mg., sugar 63 mg., chlorides 718 mg. per 100 c.cm. Wassermann positive. Steady improvement with sulpharsphenamine, and can now stand and talk.

A Wassermann test is essential in all suspicious cases, and should cerebrospinal fluid not be available for this purpose there should be no postponement because of the difficulty of obtaining blood from the infant. Puncture of one of the larger veins, or, if these are not accessible, a fairly deep stab into the heel with a sharp scalpel or edged needle will usually give enough blood.

# Reviews of Books

### Biomicroscopy of the Eye

Vol. I. M. L. BERLINER, MD, assistant professor of clinical surgery (ophthalmology), Cornell University; assistant surgeon, New York Eye and Ear Infirmary. (Hamilton Medical Books. Pp. 709. £4 4s.)

Alvar Gullstrand, in 1911, solved a problem that his generation had considered beyond solution. A successive series of magnifying lenses had already been evolved for the clinical study of the eye and such lenses are still in routine use in clinical practice; but study of the living eye under the microscope was still impossible. The magnification given by the lenses was neutralised by the lack of an adequate light source; Gullstrand, by means of the slit lamp, provided a controlled and focused beam. Clinical exploitation of his work was almost entirely due to Alfred Vogt, a versatile genius whose unique three-volume treatise on the subject is not the least of memorials he has left behind on his death a year ago. In the present volume, which is to be followed by a second and concluding volume, Dr. Milton Berliner has produced a textbook survey of the subject, differing in its treatment from the monograph study of Vogt. Other attempts at textbook surveys of biomicroscopy of the eye have been made during the past twenty years, but none so comprehensive as this. The accumulated observations of the past quarter of a century are systematised, and the survey recalls the far-reaching additions the study of biomicroscopy has made to clinical knowledge. This is strongly brought out in the chapters on the cornea: an ætiological classification of corneal lesions is beginning to emerge, to which the slit-lamp has contributed much. Study of the angle of the anterior chamber, a relatively new departure, is a direct development of slit-lamp microscopy, well described by Dr. H. S. Sugar. Profusely illustrated, simply written, and with a full bibliography, the book should do much to popularise slit-lamp microscopy.

### Nutritional Deficiencies: Diagnosis and Treatment

(2nd ed.) JOHN B. YOUMANS, MS, MD; E. WHITE PATTON, MD. (Lippincott. Pp. 389. 30s.)

THOSE who feel guiltily that they have a lot to learn about the deficiency diseases will be encouraged by the sight of this beautifully produced if expensive book. On reading it, however, the student will realise that his guilt is unjustified: deficiency diseases are, after all, only his old friends rickets, scurvy, anæmia and goitre, and his new acquaintances ariboflavinosis, and vitamin-K deficiency. They are all described in his 1944 general medical textbooks, some in greater and some in less detail than here. Within these limits the book is good. Professor Youmans gives a clear standard account of the vitamins and of the major deficiency diseases, and shows wise caution in his selection of recent claims for vitamin therapy. He has not been beguiled into advocating synthetic vitamins at the expense of a good diet or cheaper vitamin concentrates.

### Aids to Orthopædic Surgery and Fractures

(2nd ed.). I. E. ZIEVE, MA CAPE TOWN, FRCS. (Baillière. Pp. 270. 6s.)

THIS is another useful book in the *Aids* series. Nearly half is devoted to fractures and joint injuries, the rest to inflammatory diseases of bones and joints, neoplasms of bone, congenital and acquired deformities, and paralyses—in fact, to the whole of the orthopædic surgeon's work. The information is well presented and comprehensive. It is always surprising how much can be got into so small a compass. The book should be popular with students revising for their final examinations. The old terminology is used throughout.

### So You're Grown Up Now!

ARTHUR C. GEE, MRCS, DPH, asst. MOH, Holland county council, Lincolnshire. (Wright. Pp. 31. 1s.)

THIS good booklet should prove valuable to those who have to teach the young about sex. It will serve as a basis for lectures, or can be handed to adolescents to read for themselves. It deals both with the physical and emotional sides of the process of reproduction and puts the sexual act in its true perspective as only a small part of the whole cycle. Dr. Gee stresses the importance of learning to control the sex instinct, and the dangers and difficulties which may arise from failing to do so. Though attraction between young people of opposite sexes is perfectly natural and desirable, they should understand that the family is the unit upon which we have chosen to base our society, and a complete and satisfactory sexual life can be built within that framework alone.

# New Inventions

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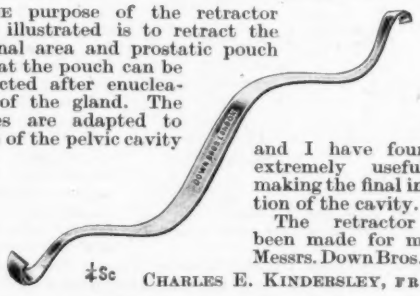

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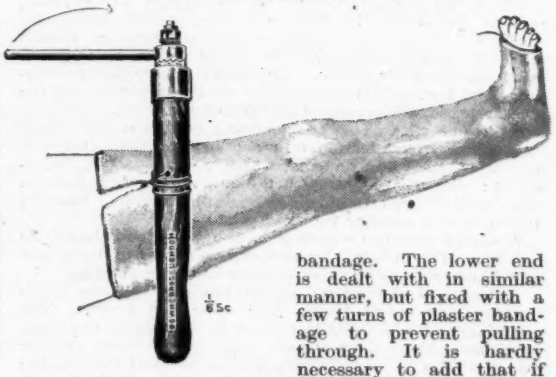
CHARLES E. KINDERSLEY, FRCS.

## WIRE PLASTER CUTTER

THE instrument here illustrated is designed to facilitate the rapid removal of plaster splints by cutting through the plaster with a wire which has been laid in it at the time of application. The wire should exceed the length of the splint by about 6 in. top and bottom. The upper end is bent over and held until required by a plain cotton bandage. The lower end is dealt with in similar manner, but fixed with a few turns of plaster bandage to prevent pulling through. It is hardly necessary to add that if any padding with wadding bandages or adhesive felt is used at the extremities of the splint, or elsewhere, for protection purposes, the wire must be "laid" superficially to this.




The instrument consists of a wooden rod about 12 in. long. One end of this is shaped to afford a good stabilising grip for the left hand; to the other end a ratchet lever is attached, giving a powerful pull for the right hand. The rod is provided with a threading hole to take no. 16 gauge galvanised iron wire, which appears to be adequate and does not rust. No excoriation of the skin has been observed after the removal of skin-tight plasters by this method. The ease with which this simple tool does the work is surprising. A mid-thigh 'Cellona' cast can be cut from end to end in a minute or less, including any additional thickness there may be due to the fixation of the stirrup. Occasionally the end of a plaster becomes somewhat soggy; it is then advisable to cut down until firm plaster is reached, so avoiding dragging of the plaster bandage by the wire. The wire will never cut a plaster which is not quite dry.

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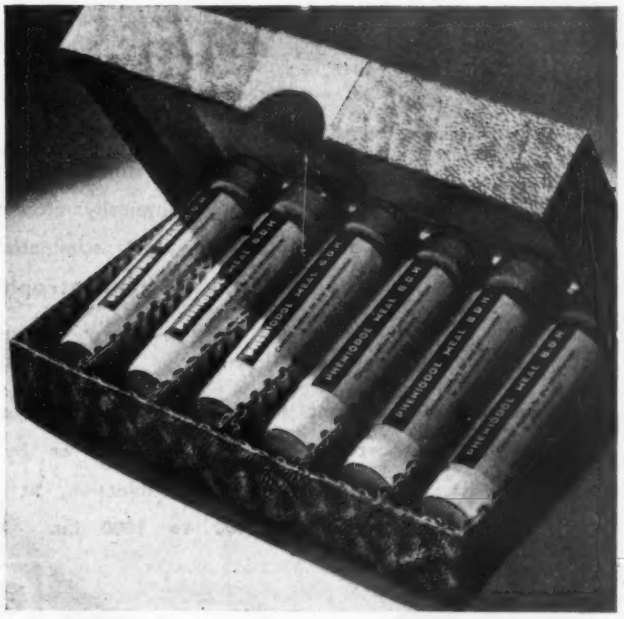


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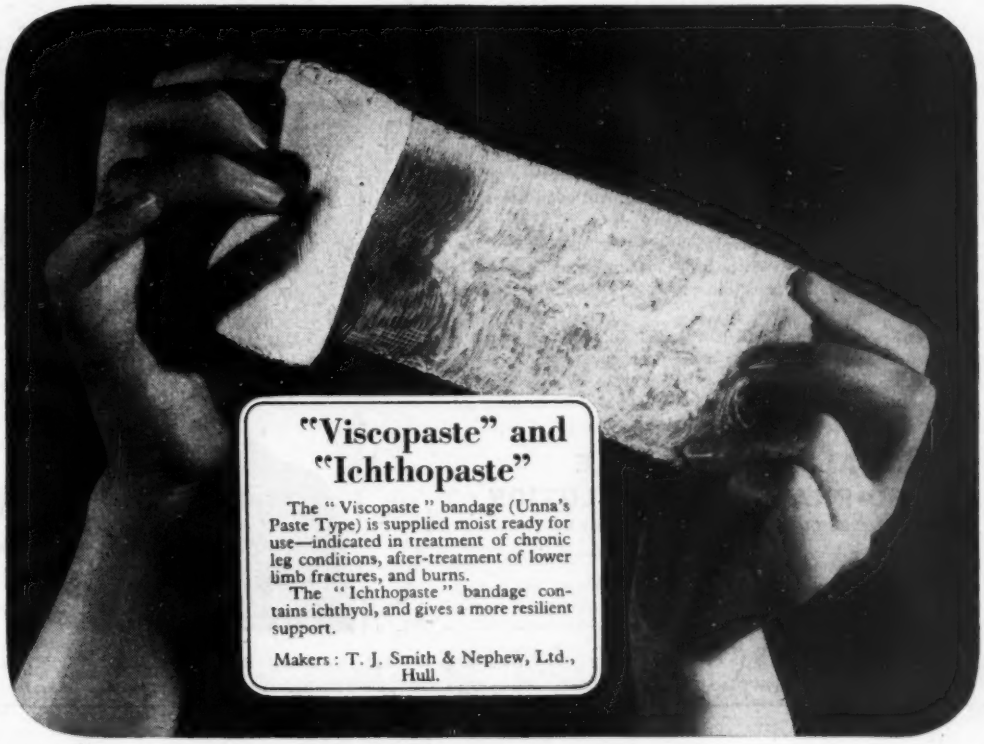

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THE LANCET

*LONDON: SATURDAY, OCTOBER 14, 1944*

## Prevention of Congenital Syphilis

EVER since syphilis was introduced into Europe by the sailors of COLUMBUS in 1493 and was disseminated throughout the Continent by the disbandment of CHARLES VIII's mercenaries after his fruitless invasion of Italy in 1495, the disease has flared up during every war. The two world wars have been no exception. Progress was made after 1918 in the treatment and prophylaxis of syphilis, and the number of new cases reported annually from the VD clinics was steadily declining until the outbreak of the present war. But since 1939 the incidence of venereal diseases has risen and the increase in adult syphilis has been accompanied by an increase in congenital syphilis. The number of new cases in infants under one year of age, as returned by the VD clinics in England and Wales, which was 339 in 1931 and fell progressively to 191 in 1940, rose to 223 and 245 in 1941 and 1942. This moreover is by no means the whole story, for the figure does not include the cases seen by practitioners outside clinics, nor of course those that remain undiagnosed. On another page Dr. LAPAGE of Manchester records six recent cases, most of which did not exhibit the classical signs and symptoms, and recalls NABARRO's statement[1] that the disease may be so mild in infancy that it passes unnoticed and is only made manifest in early adult life by the appearance of interstitial keratitis or symptoms of neurosyphilis, or indeed is discovered only when the affected person offers himself as a blood donor. The tragedy of congenital syphilis is not so much the number of stillbirths to which it gives rise—a number which in the past was probably over-estimated—as the number of survivors who later develop eye disease, deafness, and other nerve and mental disorders which, in the words of Colonel L. W. HARRISON, "convert a promising youngster from an economic asset into an economic burden."

So far as they go then, the figures indicate that during and owing to the war the incidence is increasing, and judging by experience immediately and for some time after the last war, the increase will continue unless preventive measures are taken forthwith. Congenital syphilis is almost entirely preventable and the means of preventing it have been usefully discussed at two meetings of the Medical Society for the Study of Venereal Diseases, first in 1928 and again quite recently.[2] On the latter occasion Dr. NORA WATTIE gave some encouraging figures from the antenatal clinics of the Glasgow Corporation. When the clinics were started in 1924 less than 1000 women attended and about 5% of them had positive blood reactions. By 1939 the number examined had risen to 8616 with only 1·2% positive results, and with intervening fluctuations it had risen in 1943 to 11,067 with 1·8% positive. In Glasgow the general principle followed is that syphilis in mothers and children is, whenever possible, treated where it is discovered—be it at an antenatal clinic, a child-welfare centre, or a maternity hospital; and it is this principle, aided doubtless by the enthusiasm of Dr. WATTIE and her assistants, that has yielded such success. The number of new cases of congenital syphilis under one year of age in Glasgow, which in 1922 was 335, had fallen to the gratifying figure of 15 in 1941. In the two following years it rose to 27 and 32, mainly because the increased promiscuity of war-time led to infections during pregnancy after the antenatal blood test had been made. Dr. WATTIE maintains that this is now the predominant problem in Glasgow, and doubtless the same applies to other cities; congenital syphilis from this cause cannot be prevented by the work of antenatal clinics, but only by the control of syphilis as an infectious disease. These facts lend support to our plea for the anonymous notification of venereal diseases.[3]

From analysis of figures furnished by medical officers in various parts of the country, NABARRO[4] estimates that between 1% and 2% of expectant mothers are positive reactors, and if this figure is confirmed by the Tyneside investigation now in progress, it will be evident that the potentially syphilitic stillbirths and children to be expected will number some thousands yearly unless adequate precautions are taken. A similar figure for positively reacting expectant mothers in the United States was given to Dr. NABARRO by Dr. J. R. HELLER, of the US Public Health Service, though he added that data were at the moment incomplete in the different states: New Jersey, New York, and Rhode Island in 1938 passed legislation requiring antenatal blood tests, and by September, 1943, 31 of the 48 American states had followed suit. An objection sometimes raised to the introduction of such general antenatal blood-testing and the treatment of the positive reactors is the possibility of false positive reactions in pregnancy. In the discussion on WATTIE and NABARRO's papers, Colonel HARRISON refused to dismiss this as a bogy: he said that the incidence of positive reactions among prospective blood donors (males and females) is less than half the incidence indicated for pregnant women, and pointed out that this finding may be explained by the tendency of pregnancy to make the serum labile. Dr. A. E. W. MCLACHLAN quoted the latest Newcastle figures which gave 0·9% strongly positive and 0·75% doubtful reactions in blood donors, and 1·4–2·0% positive in pregnancy according to the district. In all antenatal blood-testing one must remember that any admixture of spirit or other antiseptic or of water with the blood may give rise to doubtful or weak positive reactions; and that the test itself should be carried out by approved technique, preferably in an approved laboratory. But in the absence of these two possible sources of fallacy a strong positive reaction in a pregnant woman, verified by a repeat test, justifies the treatment of the woman both for her child's and her own sake.

What Glasgow has succeeded in doing for the prevention of congenital syphilis should be an inspiration and an example to local authorities all over the country, and should stimulate the Government to take the steps necessary to eradicate this disease. The education of the public as to what could be done is urgent—and particularly, under present conditions,

1. Nabarro, D. N. *Lancet*, 1943, i, 291.
2. Report. *Brit. J. ven. Dis.* 1944, **20**, 61.
3. Editorial. *Lancet*, 1944, ii, 17.
4. Nabarro, D. N. *Brit. J. ven. Dis.* 1944, **20**, 65.

mothers must be induced to have their first antenatal examination as soon as they believe themselves pregnant. Here we have a chance of adding some thousands of healthy children to the population each year.

## Evolution of Epidemiology

EPIDEMIOLOGY is still badly taught and poorly practised in this country, whereas the Americans have been taking a livelier interest in it—an interest which has doubtless been a spur to Professor WINSLOW of Yale in his heavy task of describing, in a scholarly, critical and readable volume,[1] the development of epidemiology through the ages. The history of epidemiology typifies the relativity of scientific theory. Thus the sanitary awakening of the nineteenth century, which accomplished so much, was based on the false assumption that dirt is the mother of disease—today we should recognise it as the wet nurse. Similarly, from time immemorial, tribes and communities have related disease and its control to malign forces which had to be propitiated or warded off—the demonic theory; or, as was the teaching of the Old Testament, to the wrath of God as a punishment for sin. A third belief centred round the movements of the heavenly bodies and magical happenings—horoscopes were being cast as late as the 17th century to determine the "critical days" for bleeding and purgation. About the 5th century BC, Greek civilisation replaced supernatural and metaphysical influences by a universe of natural law, and Greek medicine, led by HIPPOCRATES, played a notable part in this revolution of thought. Deduction from observation became established, and man's diseases were attributed to disturbances of his bodily "humours," often under the influence of atmospheric and climatic changes. The dawn of epidemiology came with HIPPOCRATES' great work, *Airs, Waters and Places*, where hot winds were blamed for poor appetites and digestive disorders, cold winds for pleurisy and acute diseases; where rain-water and upland waters were good, and marshy water associated with large stiff spleens. After HIPPOCRATES came GALEN, the rationalist—but also an acute observer and original thinker—whose concept of epidemiology, based on the factors of atmospheric influences, individual predisposition and, in a minor key, contagion, dominated medical thought and practice for many centuries.

Contagion, although vaguely appreciated in ancient times and among primitive races, as instanced by the leper laws, was first given prominence in the writings of FRACASTOR, better known for his poem on syphilis. His germs or "seminaria" were conceived as chemical rather than biological substances, susceptible to evaporation and diffusion through the air, and despite the pioneer work of LEEUWENHOEK in the 17th century this concept of infection by gaseous miasmata prevailed till PASTEUR'S time. WINSLOW blames SYDENHAM for halting epidemiological progress by his insistence on the metaphysical "epidemic constitution" and the interdependence of diseases to the exclusion of contagion, but praises RICHARD MEAD (1673–1754), who in the last of the plague tractates emphasised the importance of the spread of infection by contact and by fomites. A century later saw the rise of EDWIN CHADWICK as the apostle of sanitation, for his extensive report on the sanitary condition of the labouring population in Great Britain had shown how closely associated were filth and disease. And if the premises were false, the purification of water-supplies and the introduction of the water-carriage system of sewage resulted in the elimination of cholera and a great reduction in the morbidity of typhoid fever.

The latter half of the 19th century belonged to bacteriology, with PASTEUR, LISTER and KOCH in the van. The establishment of a tangible materies morbi, with the later recognition of the rôle of human and insect carriers, helped the moderns to unravel the riddles of the sources and modes of spread of infectious diseases. With new techniques for typing streptococci, pneumococci, typhoid and salmonella bacilli, there is a danger today that epidemiology may become too much an appendage of bacteriology. WINSLOW does well, therefore, to remind us that SNOW and BUDD and PANUM had by keen observation and logical deduction from field experience revealed the essential epidemiology of cholera and typhoid and measles before the bacteriological era. That there is still plenty of opportunity for this kind of field epidemiology has been demonstrated by PICKLES of Aysgarth in his work on infective hepatitis and the like. Some of the present difficulties in advancing epidemiological practice, such as delay in ascertainment and notification and the dual control in county areas, have been indicated by CURNOW,[2] who pleads for a local service covering larger areas, linked to a central service for specialised work and for training purposes. If some such scheme can be put into operation in association with a national public health laboratory service as outlined by DOWNIE,[3] the prospects of better control over our epidemic diseases are good. As FROST has said, epidemiology is something more than the total of its established facts; the present need is for men trained in the clinical and applied science along with improvements in the administrative machine.

## The New Family Allowances

THE size of young Americans who visit us on their way to do battle in Europe reminds us what twenty years of good eating can do for the children of men. At the end of the peace there were many children in England going short of food; not of bread, not of something to fill the belly, but of food as nutritionists understand it—of an adequate and balanced diet. How many suffered in this way it is hard to judge, but the chief medical officer of the Board of Education reported in 1938 that among 1,674,023 school-children nutrition appeared "excellent" in only 14·5%; it was subnormal or bad in 11·3% and "normal" in 74·2%. Commenting on these figures in a broadsheet on family allowances[4] we took the view that the word "excellent" should have read "normal," and the word "normal" should have read "average." Only 14·5% of these children were enjoying the abundant and vigorous health which is evidence of proper nutrition in childhood and nothing less should be accepted as "normal." Since war broke out, the fair sharing of a common food store and the end of unemployment have combined to

1. The Conquest of Epidemic Disease. By C.-E. A. Winslow, MD, professor of public health, Yale School of Medicine, New Haven. (Oxford University Press. 1943. Pp. 411. 30*s*.)

2. Curnow, R. N. *Proc. R. Soc. Med.* 1944, **37**, 483.
3. Downie, A. W. *Ibid*, p. 486.
4. An Aylesbury Broadside, 1940. 3*d*.

raise standards of nutrition among those who went short before. This gain we must conserve in the coming peace, bearing in mind that nutrition does not depend on food alone, but also on a clean and comfortable home, fresh air and proper rest.

BEVERIDGE estimated that at 1938 prices a child could be fed, clothed and warmed for 7*s*. a week. His suggested allowance of 8*s*. per child allowed 2*s*. for rise of prices, but assumed that benefits in kind provided at school in the form of meals and milk were worth 1*s*. a head. He excluded the first child from the cash allowance on the ground that most parents can afford to maintain one child. The Government also omit the firstborn, but propose an allowance of only 5*s*. a week for second and subsequent children. As they are suggesting old-age pensions higher than those advocated in the Beveridge report, many will feel that they are showing generosity at the wrong end of a citizen's life; and some have remarked cynically that old-age pensioners have votes while children have none. The decision, however, is not unexpected, for the Government have already explained [5] their view that a large part of any further subsidy to children from public funds should be given in kind as milk and meals, and they do in fact propose to extend existing services of this nature. They have even gone further than was expected, for whereas in 1943 they declared themselves willing to provide services costing 2*s*. 6*d*. a week for each child (as against the 1*s*. a week assumed by Beveridge) they now estimate the total cost of the extended school milk-and-food service at £60 million, against £69 million for the cash allowances—i.e., nearly half the children's benefits are to be in kind. This arrangement, though ensuring that the child profits by the sums spent and incidentally helps the eldest member of the family, also has drawbacks. School dinners do not continue in the holidays, and children under the age of five are excluded altogether from such extra meals. Milk may be available in urban areas to school-children out of term, but many will not trouble to go round to the school to get it. Finally, the general provision of school meals which the Government rightly have in mind may be delayed some years by difficulty in getting accommodation, staff and equipment. A parliamentary answer recorded on another page states that the present cost of milk and meals in elementary schools is only about £9 million.

The Government hold that though it is in the national interest for the state to help parents to look after their children properly, nothing should be done to remove their responsibility for doing so. The allowances offered are frankly not intended to cover the whole cost of bringing up a family; indeed the Government clearly recognise that even 8*s*. would no longer meet a child's expenses, since they propose a cash allowance of 12*s*. a week for orphans. Their policy is clearly to give their support as much as possible through the schools, so that it is bound to go to the child and not be spent on something else; and if the schools can do it we shall all agree that this is best. Pursuing the same object we suggest that the cash allowances should normally be paid directly to the mother, rather than the father, thus giving her the status which, as an unpaid worker, she lacks at present, and also increasing the probability that the money is spent directly on the children. The Government's present plan is that the allowance should be paid to the father but drawn in such a way that the mother can also cash it; but there are good grounds for reconsidering this decision in a country where the saying "Never tell a woman how much money you have" is still regarded by many as a sound maxim.

The institution of family allowances, even at a level lower than was hoped, represents an immense social gain which cannot fail to benefit the children, rapidly and conspicuously. How far it will also succeed in what is probably its secondary aim—to increase the number of those children—is something only time can show; but the maternity benefits and grants, which are also offered, should be an additional encouragement in this direction. To meet the immediate financial anxieties of confinement the Government propose a grant of £4 for all women, whether married or not, insured or not, earning or not; 13 weeks' benefit at the rate of 36*s*. for women who are earning, provided they give up work for that time; and a weekly grant of 20*s*. for 4 weeks to pay for a home-help for the housewife during the lying-in.

5. *Lancet*, 1943, i, 283.

## A Lead from Durham

WHAT most disturbs men and women in the Services is the idea that their years of absence will put them at a lasting disadvantage compared with coevals who have stayed at home. Having borne much of the burden and heat of the day they are afraid that nightfall will find them out in the cold and their civilian friends in the best seats round the fire. Those furthest from England have the added fear that they will get back latest and fare worst. They will note, however, that the general scheme for reallocating man-power at the end of the German war seems to be based more on equity than on convenience. Before anyone at all is demobilised there is to be "a pause during which the Services can identify the men who are to be released first and arrange for the return to this country of those who are overseas." Though nobody can come home if he cannot be spared, "the Services will make every effort to release men in their turn in whatever theatre of war they may be serving." And they will go on calling-up young men to take the place of older ones.

Our advertisement columns show that many major appointments are now offered temporarily: we read, for instance, that an appointment "will be readvertised after the end of the war, so that doctors now serving in the Forces may have the opportunity of applying." This, however, will hardly satisfy those who do not expect to be in Europe when the time of readvertisement comes. An excellent alternative plan has been adopted by the University of Durham, which in filling its chair of surgery "will make no appointment until it is satisfied that persons serving overseas have had full opportunity to apply." If it chooses as professor a man now in the Forces, the University will keep his chair empty but warm till his return.

APPOINTMENTS TO UNRRA.—Prof. R. R. STRUTHERS, who is on leave of absence from the chair of pædiatrics at McGill University, Montreal, has been appointed medical specialist attached to the European regional office of UNRRA. Dr. W. C. V. BROTHWOOD, deputy MOH for Lancashire, has been appointed chief medical liaison officer with Norway.

# Annotations

## PENICILLIN DOSAGE

THE sulphonamides and penicillin are believed to exert their antibacterial powers principally by preventing growth of the parasite. In the case of sulphonamides this bacteriostatic action is apparently related to interference with enzymic activities connected with the nutrition of the organism; the mode of action of penicillin has not yet been defined. What matters clinically is that these drugs, in virtue of their bacteriostasis, diffusibility and non-toxicity, can be used both locally and systemically to control bacterial growth and thus give the tissues a chance to deal with the invader and complete the kill. That this is essentially the mode of action of the sulphonamides is substantiated by the experience of Anderson and his colleagues [1] in the treatment of pneumococcal pneumonia. In young healthy adults, the results were excellent even in severe infections; in older subjects with less reactive tissues the results were poor. This important function of the host in controlling bacterial infections may be too easily overlooked in our enthusiasm for the new panaceas, and as penicillin becomes more widely available we must be prepared for many disappointments in patients whose tissues are either so old or so seriously damaged that they cannot play their essential antibacterial rôle. On the principle of bacteriostasis, it has been found that a blood-level of sulphonamides of 2–3 mg. per 100 c.cm. is as adequate for cure as a concentration of 10–15 mg.%, except in the more fulminating septicæmias. Dosage of penicillin has been planned on the same basis—that is, to maintain by frequent injections or continuous drip a bacteriostatic level in the tissues. While this system of treatment has often resulted in seemingly miraculous cures, particularly in patients treated early, there have been instances of relapse, especially in staphylococcal infections, requiring second and even third courses of penicillin. Chronic infections, such as osteomyelitis and discharging sinuses, may show both clinical and bacteriological cure after a local course of the drug, only to flare up again when treatment is discontinued. A possible explanation for these clinical observations is suggested by the experimental work of Bigger, reported on another page. Bigger found like Fisher [2] that penicillin is bactericidal to the staphylococcus, even down to concentration of $\frac{1}{24}$ unit of the drug per c.cm. of fluid. But the bactericidal action was variable, and often was not absolute. This failure to completely sterilise a broth culture of *Staph. aureus* was explained, in the light of further experiments, as due to a small number of the staphylococci being in the resting or dormant phase and thereby resistant to the penicillin which acts on the organism during or preparatory to division. Bigger calls the survivors "persisters" rather than resisters because when they begin to multiply their descendants are no more resistant than ordinary cocci. In this they differ from staphylococci which "acquire" resistance to penicillin, for these apparently can hand on their resistance to further generations, though Spink and his colleagues [3] have lately suggested that they do not constitute a danger because they are readily destroyed by the blood itself.

In view of his test-tube findings, Bigger suggests that a much larger dosage of penicillin—e.g., 400,000 units in 24 hours—should be used in the treatment of severe staphylococcal infection with a view to *killing* the organisms quickly, and that treatment should be intermittent with off-periods of a day to allow any persisters to change from the resting to the active stage, and thus become susceptible to attack by the drug. This is perhaps forgetting the host's reaction to the parasite, for ordinarily the tissues will be able to kill off small numbers of surviving bacteria unless these are inside abscess cavities, or surrounded by chronically inflamed fibrous tissue or associated with foreign bodies such as dead bone: in such instances, surgery must come to the aid of chemotherapy. The need for bigger dosage to destroy the organisms might be met by an initial dose of 50,000 to 100,000 units to allow seepage into pyæmic abscesses from which the organism may spread in relapsed infections. (In this connexion the intermittent intramuscular injection may have advantages over the continuous drip.) On the other hand, small maintenance doses over a longer period may allow the host's tissue to wall off these secondary foci, and an autogenous vaccine containing staphylococcal toxoid to stimulate the antibody mechanism should be a useful adjunct to such a course. The important point is that penicillin dosage should not become stereotyped until various permutations have been tried. Even if Bigger's experiments are not strictly comparable with the clinical infection, his suggestion of treatment by intermittent dosage is worth a trial, both systemically and locally.

1. Anderson, T. and others, see *Lancet*, July 1, 1944, p. 20.
2. Fisher, A. M. *Bull. Johns Hopk. Hosp.* 1943, **73**, 343.
3. Spink, W. W., Ferris, V. and Vivino, J. J. *Proc. Soc. exp. Biol. N.Y.* 1944, **55**, 210.

## MALNUTRITION IN JAPANESE INTERNMENT CAMPS

GROSS malnutrition is rarely seen in white people living in tropical and subtropical areas, although it is only too well known among the indigenous populations. In March of this year Whitacre,[1] repatriated from the Philippines on the *Gripsholm*, reported on conditions in a Japanese internment camp at Manila, where there were 3900 internees, 80% of them Americans. A further account has been given by four other repatriated doctors, Adolph, Greaves, Lawney and Robinson,[2] who have collected and condensed the reports of 100 repatriated physicians and nurses from 5 different camps. The essentials in the camp diets were fairly constant, though the actual dietaries differed considerably from camp to camp. The caloric intake ranged from 1500 to 2500 daily, the calcium intake was universally low (0·12–0·44 g. per day) and in most cases the protein was deficient. Vitamins A, C and D seemed to be adequate except in one camp where a number of cases with subperiosteal hæmorrhages and extensive ecchymoses pointed to a deficiency of vitamin C. All the diets were seriously deficient in vitamin-B complex. Contrary to the common belief that a starving man will eat anything, palatability of the food was found to be a most important factor. Many of the internees preferred starvation to consumption of the food supplied, a point which should be carefully noted by those dietitians who pay more attention to figures than palates. Complaints of lassitude, easy fatigue, headaches, restlessness, anorexia and loss of weight became increasingly common in all the camps as the months went by. These symptoms were attributed in some cases to the low caloric intake and in others to vitamin-B complex deficiency. The reports emphasise the importance of emotional factors and note that those who found adjustment to camp life most difficult were among those showing abrupt losses in weight. Cases of beriberi occurred at all the camps, and in most there was evidence of generalised B-complex deficiency in the appearance of mild pellagra, glossitis, cheilosis, angular stomatitis and seborrhœic skin lesions, which all responded to nicotinic acid and riboflavin. Some cases of beriberi had œdema of the ankles which responded to treatment with thiamine hydrochloride. Œdema of the ankles was prevalent in one camp where the intake of protein was particularly low, and cure was rapidly effected by increasing the protein in the diet. Diarrhœa was troublesome at two of the camps. One outbreak was due to infection with an organism of the

1. Whitacre, F. E. *J. Amer. med. Ass.* 1944, **124**, 652.
2. Adolph, W. H., Greaves, A. V., Lawney, J. C., and Robinson, H. L. *War Med.* 1944, **5**, 349.

salmonella group, but in most cases no infective agent could be found; in these the diarrhœa was attributed in one camp to the large amount of roughage in the diet and in another to nicotinic acid deficiency. In the latter, limitation of roughage with relative increase in carbohydrates merely aggravated the condition and led to the development of sore tongues and loss in weight, but daily injections of 150 mg. nicotinic acid, followed by a maintenance dose of 50 mg. daily led to "striking improvement." Stevenson,[3] in his report on conditions in German prison camps, describes the syndrome of œdema, headaches, and diarrhœa, unassociated with other symptoms and signs commonly found in vitamin-B deficiency, and concludes that the syndrome was mainly due to lack of proteins. In all the Japanese camps a large proportion of the internees suffered from an increasing affection of the eyes. The first complaint was usually of a "shimmering effect" or blurring when reading. Later some were quite unable to read. Examinations of one camp revealed irregular contraction of the field of vision with a central scotoma. Treatment with protein, thiamine hydrochloride and nicotinic acid was ineffective. At one camp riboflavin therapy seemed to result in improvement, but there were insufficient supplies to give it a proper trial. At the same camp locally grown yeast was effective in a large proportion of cases. This condition sounds similar to that reported by Wilkinson and King[4] and Fitzgerald Moore and recently referred to by Stannus.[5] These papers serve to emphasise how much we have yet to learn about nutrition, and how few symptoms and signs are specific for any one deficiency or even for deficiency of any sort. They may lead to action to improve the lot of native races, among whom the conditions now being observed in special sections of the white population are prevalent at all times.

## EARLY RISING IN THE PUERPERIUM

THE time-honoured custom of keeping patients in bed for at least ten days after delivery has again been challenged. This time Rotstein of Baltimore[6] allies himself with Charles White,[7] Kustner[8] and the many other obstetricians who have advocated early rising after the child is born. Rotstein's claims do not differ much from those of his predecessors: he maintains that involution is accelerated, the lochial flow stimulated, the incidence of thrombophlebitis reduced, and the likelihood of prolapse no greater in those patients who rise from their bed on the fourth day than in those who remain in it until the tenth or later. He reports on 150 cases, including primiparas, multiparas, breech deliveries, and deliveries by forceps and even mid-forceps. In America episiotomies are usual, and they were done on more than two-thirds of these women; the incisions healed well. When the patients were examined six weeks after confinement only 22% had any serious degree of retroversion —which compares favourably enough with other reported figures on the incidence of retroversion. The advantage of early rising is that hospital beds are more quickly freed for maternity patients.

There are however many arguments against it. Most patients enjoy a rest in bed after the anxieties and discomforts of pregnancy and the pains and exhaustion of labour. Among some working-class women relaxation during the puerperium is the nearest approach to a holiday they ever achieve. To establish the claim that prolapse is not favoured by early rising would need a careful follow-up of a large series of patients over many years. After delivery the genital canal is bruised and stretched, the uterus heavy, and common-sense suggests that if its weight is allowed to press on the flaccid pelvic floor prolapse may result. This seems to be supported by observations on races where it is the custom for women to rise early in the puerperium: among Indians, for example, prolapse is common. Again the stretching of the pelvic articulations must not be ignored; possibly sacro-iliac strain and chronic backache may be encouraged by early rising. Lastly, although Rotstein reports a somewhat reduced incidence of sepsis, his series is a small one. Many organisms inhabit the vaginal canal during the puerperium, and, if patients are allowed to walk about, raw granulating surfaces may be pulled apart and exposed to heavy infection. Whether or not early rising is the ideal routine treatment for puerperal cases, necessity sometimes enforces it. Thus during the 1941 blitz, maternity beds in London were in such urgent demand that puerperal patients had to be sent home on the fifth or sixth day after delivery. This study suggests that this practice was less reckless than it seemed at the time.

## THE HEART IN RHEUMATOID ARTHRITIS

OPINION has swung full circle since the '70s on the relationship between rheumatic fever and that large group of rheumatic diseases of which rheumatoid arthritis is the main example. Then Sibson[1] was proclaiming that there is a tendency for patients with rheumatic fever to develop gout as they get older. Ten years later Jonathan Hutchinson was stirring up a hornet's nest by claiming that many cases of rheumatoid arthritis originate in attacks of rheumatic fever. Dyce Duckworth[2] was one of those who took up the cudgels against the unitarian view and instituted a school of thought which is only now beginning to weaken. The establishment of a bacteriological cause for any of the rheumatic diseases has proved so difficult that there is strong support for the theory that, in the words of Levinthal,[3] "the disease is not due to an external specific micro-organism, but to a specific reaction of the macro-organism to any invasion by a foreign protein, whether living or dead."

One of the arguments advanced against the unitarian view has been the different incidences of cardiac involvement in rheumatic fever and rheumatoid arthritis, but recent investigations, based on necropsy findings, show that this difference is more apparent than real. Thus in a post-mortem examination of 38 cases of rheumatoid arthritis Young and Schwedel[4] found cardiac lesions in 33 cases and in 25 of these the lesion was rheumatic in origin. The mitral valve was involved in 6 cases, the aortic in 3; combined aortic and mitral involvement was present in 9 cases; mitral, aortic and tricuspid in 5; and in 1 case all four valves were affected. The rheumatic process in the heart was active in 6 of the cases. The pericardium was involved in no less than 10 cases and congestive heart-failure had occurred in 22. Most of the patients were over the age of 45 when they died. One of the most important findings was that in 14 of the 32 cases in which full clinical notes were available the cardiac lesion was not detected clinically. A definite history of rheumatic fever was obtained only twice, with a "probable" history in 2 more cases. Comparable necropsy findings were reported by Baggenstoss and Rosenberg[5] in 25 cases of chronic rheumatoid arthritis, in only 2 of which was there a history of rheumatic fever. Five of the hearts in that series were normal; in 14 rheumatic lesions were found; and the necropsy diagnosis in the remainder was myocardial infarction (2 cases), hypertension, fibrinous pericarditis, hydropericardium, and obliteration of the pericardial sac. Here again clinical diagnosis lagged far behind pathological findings, for only 7 of the 14 cases with

3. Stevenson, D. S. *Brit. med. J.* 1944, i, 658.
4. Wilkinson, P. B. and King, A. *Lancet*, 1944, i, 528. See also Greaves, A. V. *Ibid*, Aug. 12, 1944, p. 227.
5. Stannus, H. S. *Brit. med. J.* 1944, i, 103.
6. Rotstein, M. L. *J. Amer. med. Ass.* 1944, **125**, 838.
7. See Adami, J. G. *J. Obst. Gynæc.* 1922, **29**, 1.
8. Kustner, J. *Mitt. Ges. Geburtsh. Lpz.* 1899, **1**, 482.

1. Sibson, F. *Lancet*, 1870, ii, 218.
2. Duckworth, D. *St. Bart's Hosp. Rep.* 1880, **16**, 185.
3. Levinthal, W. *Ann. rheumat. Dis.* 1939, **1**, 67.
4. Young, D. and Schwedel, J. B. *Amer. Heart J.* 1944, **28**, 1.
5. Baggenstoss, A. H., Rosenberg, E. F. *Arch. intern. Med.* 1941, **67**, 241.

rheumatic cardiac lesions were known to have symptoms or signs of heart disease during life. Bayles [6] found rather a lower incidence—5 of the 22 necropsies on cases of rheumatoid arthritis with no history of rheumatic fever showed typical rheumatic carditis.

If so many patients with rheumatoid arthritis have involvement of the heart without its being detected clinically, then the previous figures based on clinical findings must be accepted with caution. The incidence of cardiac involvement in these three series is too high to be merely fortuitous. At the Mayo Clinic, according to Baggenstoss and Rosenberg, in all the material available for necropsy the incidence of rheumatic cardiac lesions was only 5 per cent., compared with 56 per cent. in rheumatoid arthritis. If these findings are confirmed they will go a long way towards re-establishing Ballonius's conception of a single "rheumatism" with manifold manifestations. But the whole story is anything but clear yet.

## TYPHUS IN THE MIDDLE EAST

MANY years' experience of typhus fever in Egypt is summarised by Kamal and Messih.[7] They show that Egypt is a country where typhus is endemic but subject to epidemic waves of prevalence ("hyperendemic" of Biraud).[8] The large-scale epidemics during the war years of 1914–18 and again in this war illustrate a classical relationship. Kamal and Messih, however, lay stress on labour recruitment and movement, rather than simple economic conditions, as the chief factor in the genesis of war-time epidemics. They regard rural Lower Egypt as a reservoir ("incubator") of the infection, whence it is spread to the cities, towns and rural areas of Upper Egypt by the movement of labour. This theory can hardly be accepted at its face value without more information about economic conditions prevailing during the war. It will be recalled that in 1942 Algeria and Tunisia also suffered the greatest outbreak of typhus for many years, at precisely the same time as the Egyptian epidemic; yet there was no mobilisation of labour for war purposes in the North African countries and Biraud held that shortage of food was mainly to blame.

The clinical features of 11,410 cases of typhus in Egypt are well described and much useful information on the variation in clinical picture will be found by those interested. There are fewer data on pathological aspects, but the Weil-Felix reaction receives attention. Of 684 cases this test (OX19) was positive in only 30% during the first week of illness and then at a titre usually of 1 in 125. Later a positive reaction was found in 86% of the cases and the authors rightly emphasise the importance of a rising titre of OX19 agglutinin as the most valuable sign in the diagnosis of the disease. They record that an agglutinin titre of 1 in 250 with proteus OX19 is found at times in sera from normal Egyptians, and in sera from patients with various diseases, and they therefore refuse to rely on a single examination by the Weil-Felix test for diagnosis. A diagnostic skin test which employs a heat-killed emulsion of OX19 is briefly described. Normal subjects react with a raised erythema 12–16 hours after intradermal injection of 0·2 c.cm. of diluted culture, and patients with typhus show no reaction. It is not stated whether the reaction is negative at all stages of the illness, or whether it is negative before the development of a positive Weil-Felix; but it seems unlikely that it will displace from favour the Castaneda slide agglutination test with proteus OX19 [9] which proved so valuable during the recent epidemic of typhus in Naples.

In the same report from Egypt, Vassiliadis reports failure to establish evidence of murine typhus by examination of rat-fleas. Such evidence is abundantly supplied, however, by experience in the British Army where cases of typhus in the Middle East were investigated by van Rooyen and Bearcroft [10] by the use of the rickettsial agglutination test. Murine typhus was found to be commoner in the troops than the epidemic variety, yet Crofton and Dick,[11] who record the clinical features of 67 cases at a British general hospital, were unable to detect sharp clinical differences between the two types of disease, although the murine patients were less severely ill. van Rooyen and Bearcroft noted a particular prevalence of murine typhus in certain Middle East countries such as Palestine, and the Suez Canal area provided more sera with a murine type of reaction than did the larger towns of Egypt.

More evidence of the ubiquity of murine typhus comes from a paper by Patel [12] who describes 6 cases of typhus in Bombay city. Of these 5 gave a positive Weil-Felix reaction with OX19 antigen, and from 1 a strain of rickettsia capable of producing orchitis was isolated in the guineapig. The remaining case gave a positive reaction with OXK and thus resembled scrub rather than murine typhus. These two varieties of typhus in India were distinguished by Boyd in 1935 [13] in an account of typhus in British troops, and the situation in India is thus analogous to that in Malay.[14] Knowledge of the geographical distribution of all these rickettsial diseases is likely to increase now that rickettsial antigens have been shown to be of value in typing, and the coming campaign in South East Asia will probably add as much to our knowledge of scrub typhus as the Middle East campaigns have added to the OX19 group of typhus fevers.

## PREVENTION OF FLUORINE INTOXICATION

THE more general recognition of the bone changes caused by the use of drinking waters containing over 5 p.p.m. of fluorine, is centring attention on methods of prevention in men and animals. The well-known fact that fluorine interferes with calcification is further exemplified by recent work in India, but Pillai and Rajagopalan [15] have shown that in rats the deleterious results of a high fluorine intake on calcification are diminished by the inclusion of calcium-containing substances such as milk or fish meal in the diet. In Madras endemic fluorosis among farm animals has been controlled by supplementary feeding with bone-meal, but it is noteworthy that the fluorine effects on the teeth are not altered in the same degree by additional calcium. In England, Kemp and others [16] found spondylosis deformans in an endemic fluorosis area only among the less well-nourished children, and the absence in Essex of skeletal changes such as are described in Southern India,[17] South Africa [18] and Texas,[19] is probably due to the higher standard of nutrition in Essex. The best preventive measure therefore seems to be an adequate diet with plenty of calcium. The fluorine hazard arising out of industrial processes in England has been receiving further notice,[20] and deserves more attention still. There is now strong evidence for the giving of additional milk to industrial workers subjected to the risk of fluorine intoxication.

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Sir JOHN LEDINGHAM, FRS, who retired from the directorship of the Lister Institute last year, died on Oct. 4. He was in his 69th year.

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## Special Articles

# THREADWORM INFECTIONS
## PREVALENCE, PATHOGENICITY, PERIODICITY AND PREVENTION

CLAYTON LANE, M D LOND.
LIEUT.-COLONEL IMS RETD

KNOWLEDGE of the life-history of *Enterobius vermicularis* has gaps because no experimental animal is known in which it will develop. Life in guineapigs, mice, rats, dogs and rhesus monkeys it will not undertake, even when attempt has been made to lessen a possible host resistance by feeding albino rats on diet deficient in vitamin A (Cram, XXVIII). But the following are established observations.

Leuckhart, by deliberate self-imposed infections, showed in 1868 that 15–28 days after swallowing the eggs the worms are mature. Within the last six years knowledge has been greatly widened by publication of Studies in Oxyuriasis, a series of 28 papers by the late Maurice C. Hall, and by Eloise B. Cram and their associate zoologists of the United States government departments.

The translucent female parasite, about to give birth to young, reaches the rectum at certain hours, passes out of the anus, travels to the perianal skin and clothing, and deposits on them chains of eggs (each female giving birth to about 10,000) after which by drying she becomes opaque and dies. Yet an individual life less than a month long is amply sufficient for the survival of the species. One reason lies in the numbers of this prolific species that may inhabit a single host, Gunawardana (1937) reporting for example the finding of 643 at a single necropsy.

A second reason lies in distinctive properties of the eggs that have been deposited outside the host. They stick to skin from which frequent bathings may not detach them, and to clothing and bedding; but once detached they must readily be airborne, for a moist camel-hair brush has collected them from cornices, mouldings and other projections at all room levels from floor to ceiling, particularly in bedrooms and dormitories where they have perhaps been started on air travel by a routine and seemly shaking out each morning of pyjamas and bedding. The viability of eggs is considerable (Cram, XXVIII): taking survival for 48 hours as a yardstick, conditions favouring this are coolness and moisture (20° C. and humidity between 30% and 54%) yet in them only 10% have done so; in conditions of warmth and moisture (28° C. and humidity between 50% and 72%) few eggs survive for 48 and none for 96 hours. Egg differs, then, from egg, and it was hard to get a 100% kill; but at any temperature the wetter the air the more eggs have survived; use of these physical conditions may perhaps aid prevention, for fumigation with hydrocyanic acid gas, naphthalene or paradichloro-benzene has been ineffective.

There is a gap in this life-history. It covers the period from the time at which the egg either reaches the nose—from which Lentze (1935) recovered it—or is more directly swallowed, and that at which the worm reaches the rectum. It could be filled in were a susceptible experimental animal known. In its absence fancy seems to have run loose: Penso (1935) held, on grounds not disclosed in that paper, that the female worm makes her way into the bowel wall, at any part of its length, and oviposits in the submucosa, there the larvæ hatch and force their way back into the lumen of the bowel. But Lentze (1935) has reported that for its development the egg must be in an acid medium for some hours; and it is not apparent how it could obtain this condition while it lies in tissue fluid within the intestinal wall, nor indeed on what ground Penso bases his whole assumption.

### PREVALENCE

Since the female threadworm rarely oviposits before leaving the bowel, microscopic examination of the stool for eggs cannot determine presence or prevalence of infection. So Hall (I) used knowledge of the worm's life-history to devise and bring into use the NIH swab, a folded strip of transparent 'Cellophane' rubbed or scraped over the perianal skin and then spread on a slide, so bringing into view under the microscope any adherent threadworm eggs, occasional artefacts in the cellophane being disregarded. Swabbings repeated on other days have added, often largely, to the number of detected infections. Thus in Washington (VI), of 222 persons ultimately found infected, the first swab detected only 80·7% and the figure 222 was reached only after six swabbings. Again in a police boys' summer camp near Washington, where Bozicevich and Brady (XV) examined 504 white lads coming mostly from rather poor families, the first swabbing detected infection in 38·8% of them while five weekly swabbings raised this figure to 57·3. Other percentage figures of prevalence got in this way are these: in a mental hospital at Tampa, Florida, 50 of 165 white women; in 6 charity homes in Habana 74·3% of 482 children; in children's homes in New Orleans 89·1% of 278 white boys. In a village near Quebec one swab gave an infection percentage of 33, while here in England M. R. Young at Cell Barnes Hospital (St. Bartholomew's) examined 119 children with these percentages of infection—after one swab 25, after two 40, and after three 52. In school-children of the Manila district of the Philippines the detected percentage of infection was 75·2.

Within this wide prevalence are variations attributable to race, age and housing.

Cram (XXIV) reported that dealing with the general population of Washington four swabbings gave infection percentages of 41·9 in 2582 whites, of 15·5 in 789 negroes and of 24·5 in 209 Jewish children. The age with the highest infection-rate was somewhat under 14 years, but in children, often classed as of preschool age (but in fact attending infant school) the rate has been as high as that at the usual school age—a further example of heightened infection where people are collected in rooms or dormitories. Barrack life can hardly fail to raise the infection-rate. Families with only one member infected formed in whites less than a quarter, in negroes more than half, of the racial totals (IX).

### PATHOGENICITY

A sure basis for listing the ill effects of any infection must be a sure distinction between infected and uninfected persons. In this infection few examinations made with this aim have been of a kind that even by repetition could hope to make this essential separation, and even those workers who have used the NIH swab most thoroughly have stated their belief that still further repetitions of swabbings would have added to the infection-rate. Again the high percentage of infections detected in children who seem to have ordinary health must raise the doubt whether this infection harms. Moreover some of the evidence held to support pathogenicity will not bear critical examination; thus because the worm's eggs have been found in the walls of an anal fistula (Fitzwilliams 1934) and female worms have been seen in the cavity of an ischio-anal abscess (Marshall and Wood 1938) it has been assumed that the parasites caused the lesions. This assumption ignores the possibility, or probability, that female worms on their journey to death have as usual oviposited when they have experienced in environment a change like to, or near to, that which normally stimulates their oviposition.

As to whether threadworms cause appendicitis views vary.

Gordon (1933) found no connexion; in 12 instances he saw minute mucosal changes, on 33 occasions worms lay in the substance of the organ's wall but the microscopic appearance satisfied Gordon that in every instance this penetration had taken place after the appendix had been removed. Such penetration when the host tissue is dead or dying, and the parasite accordingly threatened with death, seems to fall in with that urgent instinct for forward movement which normally precedes the worm's death.

Schwarz and Straub too hold (1940) that this reactionless immigration is "post-vital"; they report the frequent presence of the worms in acute appendicitis and hold them to be an important provoking cause of it. Kuitunen-Ekbaun and Morgan (1942) found however in 100 surgically removed appendices no connexion between this infection and inflammation, for the worms were present in 27 normal organs and

in 5 that were acutely inflamed, and it was in a normal appendix that they found the largest number—namely, 290.

On the other hand Nino (1942) holds the worms responsible for causing lesions: he cites two excisions of the appendix with ulcers in the mucosa of the organ and worms in the ulcer cavities as well as in the lumen and holds that the worms had caused the ulcers and had not entered pre-existing cavities. Penso had taken this view still further, holding it proved that enterobius enters not merely the appendicular mucosa but that of the intestine at any part of its length; he does not make acceptable the grounds for his conviction.

That maturing female worms have an urge for travel to the open explains the end part of their life-history, and it is presumably because of a failure to keep direction that they have been found in a fallopian tube (Chomet 1942) and eggs identified as theirs in its wall (Wu 1935). Were the worms and their eggs the cause of the inflammation, or did the results of this direct, or ease, the worm's travel along vagina, uterus and tube?

The investigation of Brady and Wright (XVIII) into symptomatology of 200 infected persons, found vaginitis commoner than had been suspected. Worms moving within the rectum caused, they held, conscious sensations, but on the skin rarely did so; enuresis was commoner in infected than in uninfected; there might be restlessness and even insomnia, and restlessness in school hours is apt to lead to trouble. An increase in eosinophilia which they detected will, they expect, be confirmed in wider examinations. Finally many infected children after treatment by means that they do not seem to state improved in colour and lost pigmentation under the eyes.

With the unsuspected infection found to be so common, severe illness must rarely be caused by it, but close study has disclosed a subnormal state of health which has improved on unworming. Further study will no doubt take up the question of the extent to which treatment has rid a host of other infections which too may have injured health.

## PERIODICITY

About 50 special examinations were made by Bozicevich and Brady (XV) at a metropolitan police boys' camp for Washington, boys mostly from poorer families.

The camp rules regulating life allowed play till 20.30 hours and prescribed bed at 21 hours. Examinations were made without instruments, the boy being in the knee-chest position with the buttocks gently separated by the examiner's hands. In many the anal sphincter thereon relaxed and gave a good view of the anal canal. From 20 hours onward gravid female worms appeared in the canal, at 21 hours they were seen at the mucocutaneous junction, but this did not happen till the boys had been in bed, usually for half an hour, and then the worms might travel as fast as 2½ in. from the anus. Their locomotion they apparently effected by fixing the head end to the skin (presumably by the suction of the bulbed muscular œsophagus) and by using the tail as another purchase point. Following exposure of the worm to the air its opacity and its oviposition promptly followed. These were normal findings, for "at any one examination fully half the boys showed one or more gravid female pinworms; many boys showed several and 1 boy consistently showed over 10."

It has escaped comment both by those who made these observations and by those whose writings have noted them, that there is here an account of a nightly periodicity in the preliminaries to, and presumably in the act of parturition as definite as that of the changes prior to and accompanying parturition and of the appearance of microfilariæ in the circulating blood in the periodic race of *Wuchereria bancrofti*. Further evidence for this statement based on examinations of Prof. E. W. O'Connor's studies is nearly ready for publication.

The threadworm periodicity has been noted in all cases examined. Its general acceptance as a thing habitual in this infection will, as usual, have to await yet wider examinations. Its confirmation will mean that in nearly every country there is the means to determine what stimulus sets in action a periodicity in worm parturitions, an investigation promising interest and value.

## PREVENTION

Threadworm eggs are rare in fæces. Keller et al. (1938) found them in North Carolina in 0·7% of 250 stools from white persons and in 0·03% of those from 630 negroes. Again Vassilkova et al. (1934) working in Moscow and Odessa have reported these in small numbers among other parasitic worm eggs in the irrigation canals of sewage farms. The eggs are destroyed by such heat as is generated in the Beccari process and this is a possible means of making a harmless and valuable fertiliser; their destruction is a part of ordinary fæcal disposal and has a minor place in the prevention of this infection.

Essential measures are those dealing with female worms that are behaving as usual and will oviposit only after having actively left the bowel for the open; and regarding these measures d'Antoni and Sawitz (1940) made disconcerting observations in a children's institution in New Orleans having 58 inmates, absence of infection in any of them being accepted only after seven negative examinations by the NIH swab.

The place, scrupulously clean, showed 38% of infections. So two extra housemaids were engaged who cleaned every room daily with hot soap and water; night wear, underwear and bedsheets were changed and sterilised daily; and each child had its own nail brush, had to take two showers daily instead of one, and was treated with gentian-violet tablets of a kind said to dissolve in the cæcum. After six weeks of this regime the rate of detected infection rose by 13%. If from the reference to cleaning by washing, it may be concluded that the increased sanitary energy did not include added air carriage by dust-raising and if the two extra maidservants were not themselves infected and did not thereby introduce new foci, the increase seems to be due to something unknown that had happened two or three weeks earlier.

Three other points need mention.

(*a*) There seems to have been one recent report only on finger-nails as collectors and carriers of these eggs; Ogura (1936) examined parings 1–3 mm. long from dirty finger-nails of 300 children in Chosen, and found eggs of various worm parasites 35 times but those of threadworms once only. Chosen can hardly be free from an otherwise world-wide infection, or finger-nails be less effective scrapers than the NIH swab; nails as egg collectors certainly need renewed study.

(*b*) In New Orleans washing down seems to have failed to prevent infection and soap tablets have contained the eggs. Could material for the bag of a vacuum cleaner be got with small enough pores to hold back threadworm eggs? If not the machine must merely set them on new air travels as surely as does the broom, and in any case it will not at present come into general use in wide areas where the infection prevails.

(*c*) Accordingly hope of preventing infection and reinfection, particularly self-reinfection, must rest on unworming by drugs. Now drug treatment may not risk a greater injury to health than is inflicted by a parasite when it is left alone, and since the drugs that have recently been advocated for the elimination of the threadworm do not meet that essential condition, drug treatment is not here allowed a heading of its own. These drugs are gentian-violet and phenothiazine.

A typical report on the aptness of *gentian-violet* to cause gastrointestinal trouble is one by Wright and Brady (1938) who treated 163 patients with half-grain doses each day given before meals for eight days. The NIH swab gave 90% of cures and the price paid was nausea, vomiting, griping diarrhœa, headache or dizziness in 69% of them; to these their study of the literature added allergy.

Phenothiazine holds an unusual position. The dose advised for sheep is 1·0 gramme for every pound of body-weight (Swales 1939), but for horse the lethal dose is 1·0 g. for every 20 lb. body-weight, Schmidt and Smotherman (1941) reporting that a dose of 60 g. had killed two of seven mares weighing between 1000 and 1200 lb. As Lapage showed (1940) it produces methæmoglobinæmia, and in so doing it destroys red cells and brings about anæmia. Of this Grant's report (1943) is typical. To a girl of 7½ years was given during seven days 14 g. of this drug; the red cells fell

to 1,810,000 and the hæmoglobin to 70%; she was given a blood-transfusion and in 18 days conditions were again normal. The death reported in THE LANCET (1942) was of a girl of 6, only suspected of threadworm infection and given 8·5 g. of the drug during 5 days. In spite of drip-transfusion of 10 oz. of blood she died with multiple small brain hæmorrhages about the corpus callosum and conditions as of hæmolytic anæmia, a name also elsewhere used for the condition the drug induces.

De Eds and Thomas report (1941) that on oxidation phenothiazine becomes first leucothionol and then thionol. They gave the drug to a man with a biliary fistula, and found all three substances in the bile and in the fæces, and they reported that thionol first stimulated and then depressed ascaris particularly when bile was present. If thionol is the real anthelmintic, there is here one more instance of this being made by the body from the drug administered, and the work raises the question whether in this chain of substances the anthelmintic and the hæmoglobin-changing links are the same.

Swales (1939) raised another old question, that of particulation of the drug by its deposit in the stomach as fine particle. He gave it to sheep as a bolus which also contained tartaric acid and bicarbonate of soda, and the carbonic acid gas produced by the mixture in the alimentary canal broke the bolus and its contents into fragments. Comparison of the numbers of worms passed during life and those recovered by necropsy satisfied him that the drug's efficacy was thereby increased. Years ago it was shown that particulation increased the anthelmentic efficacy of thymol, and as to phenothiazine it may mean equal efficacy in man when given in a smaller dose and so with lessened risk of injury or death. Again, it may prove significant as reported by Schnitzer, Siebenmann and Bett (1942) that when a second course of the drug was given to dogs, anæmia could not be produced though it had been by the first course.

With the original onset of anæmia there had gone evidences of blood regeneration—namely, anisocytosis, poikilocytosis and nucleated red cells—that is to say, the blood-forming mechanism had with the first course of treatment been stimulated into hypertrophy (but this had happened only after blood destruction had been great), had remained in some overgrowth, and had not had to be built up again from a state of merely normal potentiality when the second call on it came; so it was able without delay to replace the blood destroyed by the second course of treatment. But to give a second course in man implies satisfaction that the first had left the mechanism of blood regeneration keyed to this greater efficiency; if it had not the second would constitute a yet greater risk to life.

These writers have also pointed out how differently different species of animals react to this drug, which seems to imply a difference in the way in which they change the drug. The suggestion in what has been noted is that in the species *Homo sapiens* there is a similar difference; as Most puts it, idiosyncrasy occurs. Four years have passed since Hubble wrote (1940) "phenothiazine is probably too dangerous a remedy to be used in the routine treatment of threadworms," and they have, I suggest, done nothing to call for a change in attitude.

Drug treatment for general unworming would have to be on a huge scale, so would have to be by mouth: because the fastidiously exclusive threadworm will accept no host but man the drug must be found by experiment on man; because the worm so rarely causes serious trouble the drug may not risk causing ill health, far less death. These essential conditions are hard but provocative.

SUMMARY

Examination of the perianal skin by the NIH cellophane swab, a procedure based on knowledge of the worm's life-history, has shown the heavy and wide prevalence of *E. vermicularis*. The worm rarely does conspicuous harm, but careful examinations have shown the host's health to be subnormal. The worm rarely oviposits in the bowel, and such eggs as come away in the fæces merely form part of the problem of fæcal disposal. The normal condition is that, in persons living regulated lives, the mature female worms at a certain hour pass down the rectum and through the anus, creep along the perianal skin, oviposit on it and on the covering clothing, and die. The eggs are airborne to another or to the same host. Attempts to prevent this transfer have thus far failed, so anthelmintic drugging by mouth remains the most promising preventive. But no drug is yet known that is deadly to the worm yet less risky to man than is the infection. It needs finding.

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## Infectious Disease in England and Wales

WEEK ENDED SEPT. 30

*Notifications.*—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1838; whooping-cough, 982; diphtheria, 545; paratyphoid, 11; typhoid, 11; measles (excluding rubella), 2015; pneumonia (primary or influenzal), 479; puerperal pyrexia, 143; cerebrospinal fever, 39; poliomyelitis, 20; polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 351; ophthalmia neonatorum, 67. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Sept. 27 was 707. During the previous week the following cases were admitted: scarlet fever, 32; diphtheria, 16; measles, 11; whooping-cough, 28.

*Deaths.*—In 126 great towns there were no deaths from measles or scarlet fever, 1 (0) from an enteric fever, 8 (3) from whooping-cough, 6 (1) from diphtheria, 63 (1) from diarrhœa and enteritis under two years, and 9 (1) from influenza. The figures in parentheses are those for London itself.

Newcastle-on-Tyne reported the fatal case of enteric fever. There were 8 deaths from diarrhœa at Nottingham.

The number of stillbirths notified during the week was 182 (corresponding to a rate of 28 per thousand total births), including 14 in London.

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The King has given permission to Dr. COURTNEY GAGE to wear the decoration of chevalier, first class, of the order of St. Olav conferred on him by the King of Norway. Permission has also been granted to Lieut.-Colonel A. G. HARSANT to wear the insignia of the third class of the order of the Nile conferred on him by the King of Egypt on his retirement from the chair of anatomy in Fouad University.

# In England Now

*A Running Commentary by Peripatetic Correspondents*

"... this 'ere England," I read over my lunch in the last Penguin *New Writing*, "... they even give you money to bury yourself with now. Suits me." And sure enough when I picked up the Government white-paper there it all was in black and white in an ascending scale—£6 if you manage to die in infancy, £10 between the ages of 3 and 6, £15 between 6 and 18, and £20 if you last out till 18 or over. Quite a nice little nest egg—only of course you can't take it with you, and that's what makes me uncomfortable. Who is going to get these mementoes mori, and how are some of them going to spend the stuff? Infanticide is not an unknown practice, even unrewarded; at £6 it becomes a business proposition, and I felt very glad I was out of that class. Between 3 and 6 I suppose most people would be fairly safe, being at their peak for civilised and attractive behaviour about then. But what about the rowdy ten-year-old, the tough or moody adolescent? And those of riper years? What if their nearest and dearest preferred a cash settlement? I began to think of my nearest and dearest ... I am sorry, I shall vote against this measure—unless they let me fix things up with the undertaker and choose my own hearse and plumes before I go.

* * *

If I had fallen into the sea, or even a puddle, I might make something of it, but too much has happened since June 9 to be potted in a paragraph. Never mind; the notepaper on which this is written is Jerry paper and burns well. Normandy now is just a dream, and the earlier days there a nightmare. My chief impression of that time is feeling "this is none of I," as one did things no middle-aged oculist ought to do, such as wade through the French surf at dawn in charge of a section of 12 men; a constant tiredness and a sense that there was much more to do if only one had the energy; nights of blitzing when one crouched thankfully in a hole in the ground beneath a sheet of corrugated iron. The rich man then was the one who had the best cover, and I remember envying a colleague who had acquired the blown-off door of a tank under which to sleep, and how I went down to his place to have a look at it, as one might go in envy to see the neighbour's new Rolls. I hope I am free for ever now from that welter of blood, brains, pus and vomit.

Then a period of rest, followed by a journey into the Falaise pocket. I stayed one night at a deserted château, sleeping on the first carpet my matches illuminated. On waking I saw a bookcase full of English books, and I slept again uneasily, for something told me this was all wrong in France. But later their fly-leaves told me they belonged to a French colonel and his English wife, both patients of mine in England. We sat up in the grounds and were visited shortly by the colonel himself, who had come over from Paris, which he had entered the day before with the French armoured brigade. He took me back there with him, and I won't easily forget Paris as she looked in the moonlight. We drove round the Bois and up the Champs Elysées, and had a late supper in the Place Vendôme. Next morning he escorted me round the city—he resplendent in a pale-blue kepi laced with silver and scarlet; I in a D + 3 battle-dress, in which stains of blood, oil and flavine fought for the upper hand. Everywhere the same question, "Where are the English? Why didn't they come with the Americans?" That morning I saw in Paris one British corporal and one other rank. They saluted, so surprised they were, and we all shook hands.

Then a rush back to the unit to be told that I was to convoy my own 2 three-tonners and 18 others across France to Belgium. We carried food and water for three days and slept on top of the load, but the traffic was appalling, for two whole armies were on the move. This ignorant oculist, more used to removing fragments from the cornea than convoying three-ton trucks, had imagined that anything as big as a lorry would be difficult to lose, but the trouble was to find any of them. We made bad time, and still had 100 miles to go on the last day, but when we started at dawn someone had chalked on the front truck, BRUSSELS OR BUST, and that was how we all felt. We soon realised that whereas France had been glad to see us Belgium was delirious with joy. We were pelted with fruit, mobbed, cheered and autographed; one small boy delivered his gift apple with such warmth of feeling that he cracked my windshield. We pulled up in the outskirts of Brussels as night was coming on, and were surrounded by admirers in a flash—brandy-bottles and coffee-pots poured forth, and soon my men, who hadn't eaten much, were too dazed with fatigue to drive on, so once again we slept by the curb on the load. At dawn (sorry; dawn is bound to keep cropping up in stories like this) we made our destination, the central hospital, where we took over from a German hospital which had been left behind. For two days we worked with them—there were 600 Jerries counting the patients—and then they were removed and we had the place to ourselves. What happened there I'll tell you later.

* * *

J. G. Crowther's *Famous American Men of Science II* (Pelican Books, pp. 154, 9*d*.) deals with Thomas Alva Edison and Josiah Willard Gibbs. Edison was self-made, slightly unscrupulous, an inventor at large and the world's largest inventor. He was deaf, but his account of how he became deaf is unconvincing. He was probably traumatising and dramatising a double otitis media. Long before the alleged accident he had attended school for a few months, but made no progress. An inspector described him as addled, and if our guess is correct he was by no means the first deaf child to be so described. Gibbs was an academic physicist of Yale, who never did experiments. He suffered from a mother fixation. He was, however, a father of entropy, defined as "the availability of energy."

Mr. Crowther in this and other books is always hunting the "leisured and governing classes." Good luck to him, but one can easily have too much of it. I am the last person to deny how valuable is that spot of obsession that is present in most of us. I know at least one barrister who has made a fortune out of his own paranoia—all he has to do is imagine himself in the dock. The psychiatry books never mention this natural history of mental exuberance, yet what the world owes to its manics it would be hard to over-estimate, and schizophrenia itself has paid the churches and cults rich dividends in the form of saints and mystics. Melancholia is probably the resting stage for mania, but a few of them in the Cabinet in the next year or two might have a restraining influence on planning, spending and general expansiveness. No, I do not grudge the author his chevy, but after all the reader is buying nine penn'orth of Edison and Gibbs, and there is some much more relevant hunting to be done with these subjects.

Did the principle of entropy, for instance, account for Gibbs's mother fixation? He had a fragile body and it seems reasonable to suppose that if its energy had had to knuckle into the mêlée of married life there would not have been enough left over to make one of the greatest theoretical physicists. Similarly with Edison. Did the energy that he saved on his 8th nerves produce his astounding inventions? To be more precise, was this saved energy put into his second cranials with the result that there was much greater storage of visual memory, a greater faculty for manipulating it—plotting out the stage and inanimate characters, and then watching the play run? Here is a hare indeed, but his scalp is hard come by and his tail feathers beyond our immediate grasp; the goal is distant and the winning-post below the horizon; oceans of false analogy and masses of mixed metaphor must be swallowed or spat out before we can get to the dregs of this fascinating quart mug. For instance, ... O blast! "Time, gentlemen, please."

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MEDICAL MISSION TO CZECHOSLOVAKIA.—Mr. W. Cockburn house-governor and secretary of the Royal Hospital, Wolverhampton, referring to our statement of Sept. 23 (p. 425) that the rapid organisation of the medical mission to Czechoslovakia "has been made possible by the British Government and local authorities having granted immediate leave to Czechoslovak medical personnel," points out that voluntary hospitals have also had a hand in this matter. The Royal Hospital has granted leave to a valued member of its staff so that she might join the mission.

# Parliament

## ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House spent the whole of last week on the committee stage of the Town and Country Planning Bill. When this bill came up for second reading before the adjournment in August, it received such a slamming that it had to be withdrawn for alterations and repairs. The bill in its then form was opposed by the Corporation of the City of London, the County Councils' Association and practically every other association of local government authorities. It has been extensively and intensively considered during the recess, but its reception in committee gives no good augury for its passage into law.

The badly blitzed towns, like Plymouth and Coventry, are not satisfied because they feel it will not give them the power they need to plan and rebuild their towns in the way it should be done. Their criticisms might, however, have been smoothed over, and in fact were partly smoothed over, but a crisis arose over the compensation to be paid to landlords. The bill has already departed from the original proposals for compensation laid down by the Uthwatt report and the clauses dealing with it were a compromise between the views held by the parties comprising the Government. Differences became so acute on the floor of the House last Friday that the Prime Minister had to intervene to suggest that the compensation clauses be deleted altogether and the method of compensation for land compulsorily acquired be dealt with in a separate bill.

As Mr. Pethick Lawrence said, this is rather like rehearsing the play of *Hamlet* with the proviso that the part of Hamlet will be introduced separately at a later stage. At the moment of writing it is not clear what will happen to the bill. But it is quite clear what has happened to the Parliamentary situation.

The parties all know that the end of the war is approaching. They are therefore thinking now in terms of a general election which cannot be long postponed, and finding it difficult to agree on a compromise in which all sides have to make concessions. Mr. Bevin has said that he did not threaten to resign if the compromise on the bill as drawn was not accepted by those representing the landlord interests, but the rumour was so strong that he had to deny it.

That an election cannot be long postponed was also made clear in an answer by the Prime Minister on the question of the method of voting to be adopted by men in the Services, including those overseas. Mr. Churchill said, "I cannot think that an election is imminent in the sense of what you call impending ..." and then went on to state his view of the intentions of the Government to give overseas serving officers and men every chance of recording their votes. Other portents are the publication of statements by the Liberal party and by the Labour party, and a speech by Mr. Eden for the Conservatives clearly indicating that all parties will fight the next election as separate bodies.

Unless, therefore, some unexpected move is made in the high command of the Government the political aspect of the measures dealing with postwar reconstruction will be, from now on, predominant, and this will affect the Beveridge Social Insurance proposals and the proposals of the white-paper on a National Medical Service. A general election will inevitably be dominated by large questions such as the demobilisation and resettlement of men and women in the Services, the control of transport, mines and land, and international security. It is to be hoped that among these issues social insurance and the medical services will get adequate consideration.

The new House of Commons when it is elected will have many new faces, for some of the older members have already announced that they will not contest their seats again. Among these, unfortunately, is Dr. A. B. Howitt, Conservative MP for Reading, who has been for so long a pillar of the Medical Parliamentary Group. For many years, up to the death of Sir Francis Fremantle, Howitt was the secretary of the group and held it together through dark days. Since Fremantle's death Howitt has been chairman, and members hoped he would continue with us for many years. His wide knowledge of medical affairs, his great and consistent interest in non-party medical politics, and his friendly greeting will be a great loss to the group and to his many friends outside it.

## QUESTION TIME

### Milk and Meals in Schools

Mr. E. H. KEELING asked the Minister of Education the cost of supplying milk and meals to children attending schools.—Mr. R. A. BUTLER replied: According to the estimates submitted by local education authorities at the beginning of the present financial year, their net expenditure for the year on the provision of meals and milk for children attending public elementary schools will amount to about £9 million. This figure does not include the provision of premises and equipment free of cost by the Ministry of Works, nor does it include the cost of enabling the schools to obtain milk at the special rate of ½*d.* per ½ pint under the milk-in-schools scheme. Corresponding figures for secondary schools are not available.

### Service Rations in EMS Hospitals

Sir G. JEFFREYS asked the Minister of Health whether his attention had been drawn to the fact that rations on the civilian scale were issued instead of Service rations to wounded patients in EMS hospitals; and, as the more ample rations to which as serving personnel they were entitled would conduce to the restoration of their strength, what action he was proposing to take in this matter.—Mr. H. WILLINK replied: Where the number of Service patients is a substantial proportion of the total patients in a hospital, meat on the Home Service scale may be made available for all the Service patients. Other rations are on the civilian scale, and I have been advised that these, with the other foods available, should enable hospitals to supply their patients, both Service and civilian, with a well-balanced diet suited to their needs.—Sir G. JEFFREYS: Is the Minister aware that in Park Prewett Hospital, Hampshire, where there are, or were, some 1200 wounded Service patients, these conditions do not apply? The meat is issued on the civilian scale. Is he further aware that the medical officer in charge and the committee of that hospital drew the attention of his department to the fact that they wished Service rations to be issued to these wounded Service patients, and that they consider that their health and nourishment would be greatly benefited by the Service ration?—Mr. WILLINK: I will of course look into the position at that particular hospital, but it is surprising to me to hear that the meat position is as described.

### Local Authorities' Hospitals

Apart from specialised institutions, such as mental hospitals, maternity hospitals, infectious diseases hospitals and sanatoria, the number of beds under the control of local authorities in England and Wales is 131,440, of which 73,921 are in 154 general hospitals and 57,519 in 376 institutions for the sick, the infirm and mental cases. Of this total of 530 hospitals and institutions about 390 are administered under the Poor Law. (Mr. WILLINK replying to Sir E. GRAHAM-LITTLE.)

### Paper for Scientific Journals

Mr. E. W. SALT asked the Minister of Production whether he was aware that many important technical journals were still obliged by the paper shortage to refuse to print important technical data which would be of great value to British scientists in the development of new processes; and whether he could give an assurance that at an early opportunity the full requirement of scientific journals would be met as regards paper supplies.—Mr. OLIVER LYTTELTON replied: The fullest consideration will be given to the needs of technical journals as soon as paper supplies permit.

### Ophthalmic Services in Nigeria

Mr. B. RILEY asked the Secretary of State for the Colonies whether there were any fully qualified ophthalmic specialists in the service of the Government of Nigeria; and whether the service of such specialists was available to inhabitants of the Colony.—Colonel STANLEY replied: A government medical officer fully qualified in ophthalmology has been attached to the Nigerian government and his services have been available to the public at the government ophthalmic clinic. I understand that he will shortly be leaving Nigeria, and I am inquiring of the governor as to the arrangements

which he proposes then to make.—Mr. R. W. SORENSEN: Has he any assistants adequate to the task?—Colonel STANLEY: He has assistants, I think, but there is in Nigeria, I understand, only one other fully qualified practitioner.—Mr. RILEY: Does not the Minister consider it advisable that there should be a greater supply of ophthalmic assistants in Nigeria with its 20 million people?—Colonel STANLEY: There is an extreme scarcity of medical practitioners all over the world today, and I am governed not by what I desire to have but by what I can get.

PENICILLIN PRODUCTION.—Sir ANDREW DUNCAN stated that seven plants are at present producing penicillin in this country. Nine large-scale plants are expected to come into operation within the next six months. Two of them are about to start production.

APPROVED SOCIETIES' FUNDS.—Mr. WILLINK estimated the balance in the Approved Societies' current account on June 30, 1944, at £13,300,000 and the cost price of investments at that date at £104,400,000.

## Letters to the Editor

### PSYCHIATRIC CASUALTIES OF WAR

SIR,—Your readers will all welcome communications such as that from Colonel Elliott Cutler in your issue of Sept. 30. He no doubt will also see evidence of our friendliness in the fact that we query or criticise some of his facts and conclusions.

First I would like to ask him on what facts he bases his statement that there is an alarming increase, or indeed any increase, in the number of psychiatric casualties relative to the strength of the United States and British Armies as compared with the 1914–18 war? Are there, in fact, in the US Army relatively more or fewer psychiatrists than in the last war?

I am all in favour of his practical realism with regard to absence or desertion, but feel we must be sure of our arguments. Diagnosis must precede treatment. The well-established stability of submariners has been explained in quite other ways to me when I have inquired from the Royal Navy at various stages of the war. Further, though I am aware that this statement about the troops on Malta was made publicly, it was only partially true and most misleading.

How can we diagnose and deal with the neurotic predisposition and softness which is so widespread? If welfare and spoiling the men are to be indicted then it is curious that our rate of psychiatric breakdown is so near to that of the US Army. Our men had no sheets and have not yet got collars and ties. The Royal Air Force has a rather lower breakdown-rate than the Army, though to most of us it seems to have somewhat greater comfort for its men.

Finally, we must recognise that hatred of an ideology and hatred of the Germans that is *taught* (i.e., other than that experienced in action) are very different things. The latter has paid poor dividends, for it is in fact somewhat of an emotional boomerang.

J. R. REES, Brigadier.

SIR,—Colonel Cutler believes that "a chief difference in the two wars is the increase in neuropsychiatrical or exhaustion-neurosis casualties" and that "the alarming increase in this special category has brought the psychologist and the psychiatrist to the armies in increasing numbers." It would be interesting to know how these comparisons were drawn; since, for example, it is known that in the present American Army, as compared with that of 1918, there has been, at least so far, a substantial *decrease* in the number of psychiatrists in proportion to the strength of the forces. More important, however, is Colonel Cutler's use of this "increase" in psychiatric casualties in this war as a premise for sociological conclusions with which many of us would find it hard to agree. For this reason, it should be said that there is no evidence of any increase in psychiatric casualties in this war. It is impossible, for security reasons, to give in detail the figures which do exist; but no-one aware of the facts is likely to doubt the suggestion that if there has been a change in incidence it is likely to be a decrease.

In order to correct any impression that psychiatric casualties were rare in the US Army of 1918, it may be wise to give some figures published [1] by the US Veterans Administration, a body which corresponds to our Ministry of Pensions. Despite the relatively short period during which US troops were exposed to combat stress in World War I, during the period 1923–40 the pensions and treatment of these disabilities, excluding domiciliary care, cost the US Government $924 million; and even as late as 1940 the annual cost was over $40 million. "Three out of every five beds in the 79 Veterans Administration Hospitals were occupied by 'service patients' with service-connected psychiatric disabilities." Finally, at the Armistice in 1918, "693 psychiatrists were employed" for service duties by the US Government. Then, as now, there were protests from combatant and line officers regarding the danger of "inducting" into the US Army, even for limited service, men whose psychiatric condition made them completely unsuited for such work. There was, for example, General Pershing's cable, sent to Washington from France on July 15, 1918:

> "Prevalence of mental disorders in replacement troops recently received suggests urgent importance of intensive efforts in eliminating mentally unfit from organisations new draft prior to departure from the United States. Psychiatric forces and accommodations here inadequate to handle a greater proportion of mental cases than heretofore arriving, and if less time is taken to organise and train new divisions, elimination work should be speeded."

With regard to the British situation, in the early years after World War I there were over 100,000 pensions awarded for attributable service psychiatric disabilities, including effort syndrome. These cost roughly £10 million annually (Ministry of Pensions report, 1931) and it is conservatively estimated that in 1939 such pensions were still costing this country over £4 million per annum. The War Office report on Shell Shock (1922) deals with this problem.

The demands of space, and the difficulties of political discussion for serving officers, make it impossible to do more than disagree with Colonel Cutler's suggestions as to what happened, at least in this country, between the two wars. If, as all available evidence suggests, there is likely to be a decrease rather than an increase in psychiatric casualties in the present war, and if, as seems rather more certain, the prognosis when they do occur is rather more favourable, many of us would be inclined to suggest that this is the result of those very factors which are advanced in the Linacre lecture as the basis of the "change" in military mental health in this war—more tolerance, better welfare and new methods of officer selection. To put the matter in the terms which experience suggests are most convincing to those of us away from combat areas, there is more than enough evidence to show that it pays, even in hard cash, to plan and administer for the soldier, not on a veterinary basis, but with due respect to his human qualities. There can be little objection to the suggestion that it will always pay, on any basis, to select officers by the best available methods, and, whatever the methods, to improve them by checking up the results. If the reports of field commanders are to be believed, there is very little wrong with the junior officers of today.

Finally, it is impossible to avoid pondering the remarks on the "softness" of life between the two wars. They call to mind a bitter comment recently overheard on Clydeside—"The end o' the war'll be no long noo. I see they're paintin' up the labour burroos."

A. T. M. WILSON,
Lieut.-Colonel.

### UNSUSPECTED TUBERCLE

SIR,—In his letter of Sept. 16 Dr. E. H. Hudson appears to blame the radiologist for delay in treatment, when the latter has not advised the practitioner to seek "reference to tuberculosis officer or other competent physician." If "the radiologist would qualify his statement by suggesting confirmation" by these authorities would he, the radiologist, then be freed from this blame? I might reasonably ask, what right has the radiologist so to belittle the judgment of the practitioner? He certainly has no evidence to indicate that any useful contribution could thus be obtained to the radiologist's interpretation. The clinician who sends

1. Cooley, M. *War Med.* 1941, **1**, 372.

the case for X-ray examination has charge of it; the radiologist is merely asked for the opinion he, as a medical man with expert training in the technique and interpretation of radiological appearances, is best qualified to give. The practitioner shows his desire to coöperate by sending with the case such details of the clinical history and findings as cause him to make the request. I see no reason why the radiologist should doubt the practitioner's ability to assess the additional evidence he supplies or to call in such other experts as he sees fit. Contrary to the indifferent clinician who sends cases to the X-ray dept. with the request "X-ray chest" without any indication of the clinical findings, even of those sent to him, the practitioner has given evidence that he has made a clinical examination and knows the history. Such a practitioner is therefore as capable as anyone else of recognising obvious radiographic signs—they can easily be taught to the novice even more readily than the more obvious clinical signs. The early signs, on the other hand, whether clinical or radiological, need the infinite capacity for taking pains which characterise alike the work of the good physician and good radiologist.

In spite of statements to the contrary there is evidence that with increased use of X rays there is a concomitant deterioration in clinical examinations. The hasty and indifferent clinical examination is not materially assisted by radiological interpretation of a like nature, for I have knowledge of operative measures on structures in symptomless patients which were radiologically normal and of failure to treat lesions shown on radiograms of patients with definite localised signs and symptoms, because the radiographic appearances were interpreted as normal. In other words the radiographic appearances as interpreted, and not the patient's condition, decided the treatment. These experiences indicate that radiology permits the indifferent clinician to masquerade as a physician.

Neither the physician nor the radiologist need fear neglect through helpful coöperation.

Even if the radiologist is so unwise as to report "the disease is inactive" I cannot think he does much harm, except to himself, seeing that the doctor has sent the patient to him because of existing clinical signs and symptoms which he is unlikely to ignore.

Edgbaston, Birmingham. JAMES F. BRAILSFORD.

## CARDIAC NEUROSIS AS A MANIFESTATION OF HYPOGLYCÆMIA

SIR,—I rather agree with Dr. Richards's criticism of my paper on cardiac neurosis and hypoglycæmia. Had I given a fuller account of the psychological condition of the patients he would not, I think, have criticised my conclusion, which was simply that the symptoms of the two conditions are sometimes identical because both sets are produced by excessive adrenaline secretion, in response in the one to fear and in the other to a low blood-sugar. The question whether my patients had hysteria or an anxiety neurosis does not, within the strict limits I set myself, really arise. In fact, as I pointed out, two of my cases were obviously neurotic individuals. Their neurosis was not relieved by treatment, though their cardiac symptoms were. My first patient, who fell to the ground without losing consciousness, was definitely not hysterical. Dr. Richards appears to believe that anybody who does this must be hysterical, but there are many other possible causes, including, before the war, slipping on banana skins.

I agree with Dr. Richards that the symptoms shown by my patients were symptoms also of an anxiety state. Some writers have assumed, I think on insufficient evidence, that the mild spontaneous hypoglycæmia so commonly encountered, an example of which was described by Dr. Prunty in the *British Medical Journal* of Sept. 23, is due to an anxiety state. Others have even gone so far as to suggest that patients in an anxiety state suffer these symptoms because the anxiety state produces hypoglycæmia. I carefully avoided discussion of this point because there is as yet insufficient evidence for discussion to be fruitful.

It is true that there was not an absolutely consistent relationship between blood-sugar level and symptoms. All those who have studied the subject agree that there never is. One could hardly expect it in view of the highly complex manner in which blood-sugar levels are controlled. Nevertheless, the usually accepted criteria were fulfilled in all my patients—the symptoms were associated with a blood-sugar level unusually low for the patient in question; they could be reproduced by lowering the blood-sugar; and they could be relieved by giving glucose. There was sufficient correlation between the onset and relief of symptoms and the blood-sugar levels for suggestion to be excluded.

Whitchurch, Bucks. RAYMOND GREENE.

## MEDICAL PLANNING AND THE SERVING DOCTOR

SIR,—I wish to comment on one phrase in your leading article of August 12, in which you refer to "the widespread impression that Service officers as a whole are relatively favourable to change." This harmless statement is certainly true, but it seems in its context to be intended to mean that most serving doctors are in favour of state medicine as proposed in the white-paper. No-one has the least right to make that supposition. The attempt to prove that the relatively inarticulate serving officer is welcoming the prospect of a continuance of state medicine for the rest of his life is rather cynical propaganda. I meet a fair number of medical officers, and they are no more unanimous than the practitioners at home seem to be. Some look forward to the idea with enthusiasm, others hate it bitterly, both with complete sincerity. Most however make a jest of it. After all, a very important medical politician repeated out here recently what we have been told already, that state medicine is coming, whether we like it or not. Meanwhile, the war goes on and there is work to be done: perhaps we shall move on to the Far East: sometime we shall get back to our families, which is the most constant of the dreams of the man serving overseas. After that we shall find out what all this medical planning is about.

Impressions are notoriously unreliable, but I am as entitled to mine as you are to yours. I do not know how widespread is the feeling I have tried to represent, but it certainly exists.

CMF. MALEESH.

## POSTURE IN LUMBAR PUNCTURE

SIR,—Your leading article of Sept. 23 (p. 410) will warn doctors, particularly hospital residents, who have to perform lumbar punctures fairly frequently, about the dangers and distressing after-effects which are bound to occur if a faulty technique is used. Very little is usually taught about the after care of patients who have had to undergo this minor operation. Even when the lumbar puncture has been performed with skill and the necessary care, unpleasant after-effects are not rare. Of these the most frequent and troublesome is headache, sometimes of great intensity, which may last for several days. This is mostly due to leakage of cerebrospinal fluid through the puncture opening in the meninges. Having performed a few hundred lumbar punctures, I have found that correct aftercare is an important factor in preventing low-pressure headaches. Usually, after a lumbar puncture has been performed, the patient is made to lie flat on his back for several hours and then is allowed to get up. Trying out different postures, I found that the prone one prevents leakage of cerebrospinal fluid from the site of puncture and therefore the headache as well. The action of the prone position may be further increased by raising the foot of the bed. The method I adopted is as follows. The lumbar puncture being completed, the patient is made to lie flat on his abdomen with as little disturbance as possible, the head being turned to the side and no pillows allowed. The foot of the bed has previously been raised. The patient remains in this position for two hours. At the third hour one pillow is added and an hour later a second. After another hour the patient is made to lie on his back and a third pillow is added. Generally 12 hours after the lumbar puncture the patient is allowed to get up. Usually, I perform the lumbar puncture in the evening so that next morning the patient can go home. Coffee and alcoholic drinks are forbidden for 48 hours after the investigation. Since I have followed this technique, I have seen practically no troublesome after-effects. Headaches were rare and when present were always slight and lasted a few hours only.

French Hospital, London. M. BENDIT.

## SPREAD OF SCABIES

SIR,—In his section on scabies in *Common Skin Diseases* (p. 115), Roxburgh, in common with most other writers on the subject, is emphatic that "fairly close and prolonged contact" is usually necessary before scabies can be transmitted, and he states that the usual social contacts between adults are unlikely to spread the disease. During recent investigations of an outbreak of scabies in a printing works in this city the only common factor which could be found among various patients was the passage of packets of paper from one person to another. Four workers next on an assembly line from the original victim were infected, while those who handled the paper before her were free from the disease. I would be interested to hear of any similar experience.

Dublin. J. FLEETWOOD.

## YELLOW FEVER

SIR,—Clinicians, pathologists, epidemiologists and field hygiene specialists will give a warm welcome to the work of Brigadier G. M. Findlay and his colleagues in helping to determine the nature and causation of hepatitis following prophylactic inoculation against yellow fever (*Lancet*, Sept. 2, 9 and 16). Not only have they pointed to the factor responsible for this complication but they have more clearly demonstrated the way of preventing it in future—namely, by avoiding the use of icterogenic serum in preparation of the vaccine.

But it would be a mistake to dwell so much on the icterogenic potentialities of previous batches of vaccine that we lose sight of the real boon this preventive measure has conferred on humanity and war-time Africa in particular.

In October, 1942, the Secretary of State for War said in Parliament that at least 135,000 people had been inoculated against yellow fever between January, 1941, and June, 1942, and that there had been only 3 cases of yellow fever among British and Allied troops since the outbreak of war. These cases occurred in European troops serving in the West African Command and were under my care in a general military hospital. The diagnosis was confirmed by pathological and postmortem evidence as the attacks were very severe and two of the patients died. The cases were admitted in January and February, 1942. This was the critical period of the transfiguration of the North African campaign, and thousands of men and tons of supplies were passing by sea and air from West Africa to the Middle East. An outbreak of yellow fever at this juncture might have had devastating consequences; but it did not occur. The silent testimony of a Polish officer and a British sergeant proved that the combustible elements for an outbreak were indeed present; but they fizzled out on contact with the sera of those inoculated, were they icterogenic or otherwise!

MOUNTJOY ELLIOTT.

## TROPIC OR TROPHIC?

SIR,—I have just read with great satisfaction the letter from Dr. A. E. Meyer, of Brooklyn, NY, in your issue of Sept. 30, and I heartily concur in his support of the word *tropic*, used in connexion with pituitary and other hormones. Last December I drafted the following footnote for p. 807 of the next edition of Beattie and Dickson's *Textbook of Pathology*:

> We note with regret the tendency of late to alter the second component of this series of terms from "-tropic" to "-trophic." We ourselves, however, prefer to retain the original form "-tropic," as signifying "*turning towards*" and so "influencing," on the analogy of the recognised biological term "tropism," which means the turning of an organism towards, and in response to, some particular external *stimulus* such as sunlight—rather than "-trophic," which would imply that there must also of necessity be some element of "nourishment" or "regulation of the nutrition" of the organ or tissue influenced. That the correct signification is that of "*turning towards*" is further borne out by the analogous series of expressions "dermo*tropic*," "neuro*tropic*," &c., as applied to certain viruses (p. 105), which can scarcely be interpreted as signifying viruses that "nourish" the skin, nervous system, &c.

London, W.1. W. E. CARNEGIE DICKSON.

# On Active Service

## CASUALTIES

KILLED

Lieutenant ROBERT RUSSELL WADDELL, MB GLASG., RAMC
Flight-Lieutenant GEORGE EDWARD THOMAS SODEN, MRCS, RAFVR

DIED

Captain I. M. HILL, RAMC

WOUNDED

Lieutenant G. R. CONNOLLY, MB DUBL., RAMC
Lieutenant W. L. COOPER, RAMC
Captain I. S. DALTON, MB LOND., RAMC
Major R. L. HARWARD, MB LOND., RAMC
Captain P. W. HENDERSON, BM OXFD, RAMC
Captain MALCOLM MACINTYRE, LRCPE, RAMC
Major J. B. MENZIES, MB EDIN., RAMC
Lieutenant J. H. ORR, MB DURH., RAMC
Lieutenant T. R. STEPHENS, MB BRIST., RAMC
Captain D. H. SWAYNE, BM OXFD, RAMC
Captain I. F. THOMSON, MB LOND., RAMC
Captain V. F. TYNDALL, MB ST. AND.

## AWARDS

DSO

Major D. G. C. WHYTE, MB BELF., RAMC

MC

Captain RADHA RAMAN, LAL, MB, IAMC

## MEMOIR

Captain C. R. VEALE was born in Battersea in 1919 and educated at Walter St. John High School there. He took the Conjoint qualification from Charing Cross Hospital in 1942, and was appointed house-surgeon at Ashridge Hospital under Mr. Norman Lake, who writes: "Veale's enthusiasm and zeal for the welfare of his patients were magnificent and they all loved him. Beneath an unassuming manner he had a splendid ability and there was no-one on the staff who did not admire both his work and his character. Sincere, staunch and bright, he was a most delightful colleague." Veale joined the RAMC at the end of 1942 and sailed with a regiment of the Royal Armoured Corps to Normandy shortly after D-day.

He was killed near Noyes in July trying to rescue a wounded man under fire. His colonel relates how he was warned to go cautiously when his car came under enemy fire but insisted on going forward. "Charles had three half-tracked, semi-armoured ambulances," a brother officer writes, "and he was always saying that he had to help the infantry, because they only had jeeps for collecting casualties. The very morning he was killed he said to me 'I don't seem able to do my own job, everyone else does it for me,' meaning that first-aid was given to casualties by the troops themselves on the spot, but he didn't add that it was due to his own efforts through difficult days of training that every man in the regiment had a thorough grounding in first-aid. Charles's eager spirit made him go right into the battle in his semi-armoured vehicle to collect casualties almost before they were wounded. He did it almost in disregard of orders, but not without realising the danger, for he often left his driver behind and drove himself."

Captain Veale married Miss Anita Burnham in 1942 and their son was born this year.

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ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—At a meeting to be held at 26, Portland Place, London, W.1, on Thursday, Oct. 19, at 3 PM., Dr. L. G. Eddey will speak on spray killing of mosquitoes in houses as a contribution to malaria control on the Gold Coast.

EUGENICS SOCIETY.—On Tuesday, Oct. 17, at 5.30 PM, at a meeting in the rooms of the Royal Society, Burlington House, Piccadilly, London, W.1, Dr. Innes Pearse will speak on the health centre and the family.

# Obituary

## ALEXANDER BREMNER

CBE, MC, M D EDIN, D T M & H, D P H, T D

Colonel Bremner died suddenly at his home in Sheffield on Sept. 29, aged 54. He had led an adventurous and unselfish life as a physician and as a soldier in two wars. Son of Robert Sutherland Bremner, schoolmaster, he was born at North Roe, Shetland, educated at the Anderson Institute there, and at Edinburgh University where he was a prominent member of the OTC and graduated MB in 1913. When war broke out in 1914 he joined the army as a sergeant-major and an unofficial MO to a battalion raised in Hull by Auckland Geddes, being soon transferred to the RAMC; but after a few months in France he was invalided home with typhoid fever, and later was attached to the Dublin Fusiliers, seeing service at Suvla Bay, Salonika, Egypt and Palestine. He was in the *Transylvania* when she was torpedoed in the Mediterranean and spent several hours in the sea before being rescued. For valour in rescuing wounded under fire he was awarded the Military Cross.

In 1919 Bremner married Miss Ella Elphinston, herself an Edinburgh medical graduate, and settled at Sheffield, where he took over the practice of his uncle, Dr. S. M. Inkster. In 1925 he became deputy director of the Edgar Allen Institute and in 1926 hon. physician to the Children's Hospital, whose progressive policy was largely due to his wise advice and administrative ability. He also lectured on pædiatrics at the university. Among other appointments he held were those of MO for tropical diseases to the Ministry of Pensions, and examining factory surgeon. The aftercare and rehabilitation of rheumatic children was his preoccupation, and he organised the clinic for rheumatism under the school authority, acting not only as physician but as committeeman and administrator. He had a talent for getting things done and a capacity for persuading other people that things ought to be done.

He joined the Territorial Army as MO to the 71st Field Brigade RA about 1925 and continued to serve with them until the early part of 1940, when he was promoted lieutenant-colonel and went out in command of a field ambulance and acting ADMS. Although his division was largely untrained, he led his command from the south of France to Belgium when the Germans broke through in May, 1940, the story of which is an epic in itself. The only order Bremner received during the retreat to Dunkirk was one instructing him to set up a casualty clearing station in a certain village. His reply was that he would be delighted if it were not for the fact that his German was a little rusty; the previous evening he had pulled out from one end of the village while the Germans were entering the other end. The only boast he allowed himself over this part of the campaign was that in his sector not one wounded man was left behind. While still thirty miles from the coast a shell-burst severely wounded him and eight of his medical officers, but they managed to reach Dunkirk with the help of a quartermaster who drove the ambulance through screens of shells at each cross-roads and frequent machine-gunning from German planes. Back in England, he spent some months in hospital, mending his fractured legs, but getting wind of further adventures he attended, limping badly, a medical board which was to decide his capacity for further service. Finding that the senior member of the board was a major, he elected himself chairman and passed himself fit for active service—a decision reviewed later by a board of generals. He was promoted colonel AMS in charge of a general hospital, and with this unit he landed with the first British troops in North Africa. His equipment was sunk in harbour by enemy action, but under heavy aerial bombardment he organised the salvage of enough stores to erect a hospital, receiving casualties within a few days. He was again mentioned in dispatches and later was awarded the CBE. In North Africa he organised the hospital medical service's disinfecting station. He returned to this country in October, 1943, after his services had been asked for by his hospital and by the university, when he threw himself immediately into organising means to assist those now in the Forces on returning to civilian life. His understanding of their postwar problems was helpful to many young Army doctors.

A correspondent writes: In all Bremner's actions, whether in civilian or military life, could be discerned his high courage, unselfishness and humour. A strikingly handsome man with the exuberant fair hair and direct blue eyes of his Scandinavian forbears, he was vigorous and restless; but when he entered a sickroom he turned off his restlessness as if with a tap and became the ideal physician who inspired confidence by his rock-like steadiness, gentleness and common sense. If anyone was really ill, he would go to infinite trouble to reach the correct diagnosis and to apply the proper treatment. He was particularly successful with children, probably because he himself was still a boy at heart. Often his therapeutic measures were helped by gifts, and to one boy in whom he discovered a flair for biology he presented a microscope and mounted specimens of insects. Then for days he could be found gravely discussing with his boy patient the finer points of bed bugs and fleas. It is said that he had more non-paying patients than any other doctor in Sheffield, and indeed his generosity was a byword in the town. He had a genius for making and keeping friends, and though always at his best he was never more so than when entertaining them at home.

## JAMES TELFER CALVERT

CIE, M B LOND., F R C P, D P H

Lieut.-Colonel Calvert, who died at his home in Eastbourne on Sept. 20, was an able and popular officer of the Indian Medical Service who filled important posts. After qualifying in 1887 from St. Thomas's Hospital, he held several house appointments there before joining the IMS with a high place in the entrance examination. He saw active service on both the North-eastern and North-western Frontiers of India, and then entered the Bengal civil medical department. At Cuttack in Orissa, where he was civil surgeon and took charge of a medical school, he showed a natural bent for surgery; but, when he found no opening on the surgical side of the Calcutta Medical College Hospitals, with characteristic energy he took the membership examination of the Royal College of Physicians in 1906, and was rewarded with the appointment of physician and professor of materia medica in Calcutta. He edited an edition of Ghosh's *Materia Medica* and showed a healthy scepticism towards new drugs until their position had become well established. When a vacancy occurred in the senior post of principal of the Calcutta Medical Hospital and College and professor of medicine, he was the obvious choice. This is one of the most onerous medical appointments in India, involving the administration of a large group of hospitals and of a large medical school in addition to charge of beds and teaching work. Calvert was also dean of the medical faculty of Calcutta University, in which post he did valuable work, and his sound knowledge of medicine ensured to him a large consulting practice in both the European and Indian communities. His abilities found full scope, and his successful work was recognised by the award of the CIE and his election as FRCP in 1917. Soon after his retirement—which took place under the age rules before he could obtain promotion to higher administrative rank—it was found necessary to relieve the professor of medicine of administrative duties by the appointment of an additional senior officer.

After his retirement Colonel Calvert lived quietly at Eastbourne with his wife, three sons—two of whom are now serving in our military forces—and one daughter. His breezy personality and his remarkable fund of good stories brought him many friends.

## Appointments

BATEMAN, JEAN, MB LEEDS: RSO at the Birmingham Accident Hospital.

LINDSAY, JAMES, MD EDIN., MRCP: medical referee for the county-court districts of Bath, Chippenham, Frome, Melksham, Trowbridge, Warminster, Wincanton, Calne, Devizes, Hungerford, Malmesbury, Marlborough, Newbury and Swindon (circuit 52).

*The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.*

## DR. LEWIS SMITH

H. L. T. writes: As a former pupil and for many years subsequently a friend of Dr. Lewis Smith, I feel that the obituary notice of Sept. 30 does not do full justice to him as a man and as a physician, and does not present a portrait which would be recognised by a large circle who knew and admired him.

"L. A.," as he was affectionately called, excelled in two branches of a physician's profession, as a teacher and as a consulting physician in practice. It is given to few men to add a third success to these time-consuming and tiring activities.

He possessed to the full the qualities necessary for a successful teacher. On the basis of a sound knowledge of medicine, he was alert and clear in expression, careful and thorough without wasting time, and with beautiful hands in physical examination, with a sense of humour and the power of being firm when necessary both with patients and students. He taught usually to the standard of qualification, but this was not the limit of his knowledge, and often some chance question from a student would reveal his full acquaintance with a subject.

These qualities, together with an innate knowledge of human nature and a quick sympathy with human beings, brought him a large practice which he thoroughly enjoyed. He had the gift of friendship, and his attractive personality made him a delightful companion, and these gave him a large circle in which his presence was always welcome and to whom in his last few years his cheery letters were always a pleasure.

# Notes and News

## AIR EVACUATION OF CASUALTIES

Major-General D. N. W. Grant, air surgeon of the US Army Air Forces, in an address on Oct. 3 at the AAF School of Air Evacuation at Bowman Field, Kentucky, disclosed that C 54s of the Air Transport Command were now flying combat casualties home to the USA at the rate of 4000 a month—about 40% of all casualties returning from overseas. The school will be made a division of the AAF School of Aviation Medicine on Oct. 15. In the past two years it has organised 29 medical air-evacuation squadrons and trained nearly 1000 flight nurses and a comparable number of surgical technicians. Since Pearl Harbour more than 425,000 sick and wounded patients of the US and Allied forces have been evacuated by air, and since D-day 55,000 have been evacuated from France by the C 47's of the Ninth Troop Carrier Command. General Grant added that though the most critical cases were given air priority, the death-rate of air-evacuated patients after admission to Army general hospitals in England was reported to be only 0·4%.

## VITAMIN C IN TOMATOES

THE ascorbic acid content of ripe tomatoes bears a close relationship to their size—the bigger the tomato the less the vitamin content per gramme until a weight of 30 g. is reached, after which there is no further fall. Hallsworth and Lewis (*Nature, Lond.* Sept. 30, 1944, p. 431), who made this observation in Sydney, NSW, show that there is a close correlation between ascorbic acid content and the ratio of surface area to weight. This might be foreseen if we assume that the vitamin is synthesised by the action of the sun's rays. They found a wide variation in ascorbic acid content from bush to bush, and seed taken from plants with a high yield tended to hand on this quality, suggesting a profitable field for the breeder. The fruit ripening together on a bush showed a closely similar content, but it increased as the plant aged, even in the autumn when the days were shortening.

### Training Grants for Service Psychiatrists

The Child Guidance Council has set aside £500 to give as grants to medical officers with psychiatric and preferably pædiatric experience who wish to train as child psychiatrists when they leave the Services. Inquiries should be sent to the secretary of the council, 39, Queen Anne Street, London.

### London County Council

Dr. J. A. Scott has been appointed a principal medical officer, and Dr. F. J. Bentley a senior medical officer, in the public health department of the council, primarily for duties in connexion with the work arising from consideration of the proposals of the Government for the establishment of a national health service.

Dr. Scott, who is 44, graduated MB at the University of Liverpool in 1924, taking his DPH two years later and his MD in 1927. After holding resident appointments at the City Hospital North and Alder Hey Hospital in Liverpool he joined the staff of the Surrey county council as an assistant medical officer. He was for some time MOH and school MO for Barnsley before he was appointed to his present post as MOH for Fulham. He has written much on problems of practice and public administration. He was awarded the OBE in 1941.

Dr. Bentley, who is also 44, is at present a principal assistant medical officer of the council. He graduated MB at Durham in 1922 and MD in 1924. He obtained the DPH in 1928 and like Dr. Scott has held an appointment with the Surrey county council. As a clinical assistant at the Hospital for Sick Children, Great Ormond Street, he had made a special study of rheumatism, and in 1927 when he was already a divisional medical officer of the LCC he contributed to the Medical Research Council's report on social conditions and acute rheumatism. He was also the author of the MRC report on artificial pneumothorax published in 1936, and in 1940 discussed the scope of mass radiography.

### National Health Service

In a report submitted to the city council last Tuesday the Birmingham public health and maternity and child-welfare committee welcomes in principle the proposals of the white-paper on a National Health Service, but urges variations. It thinks that the administration of hospitals at present owned by local authorities should remain with these local authorities under arrangements similar to those suggested for voluntary hospitals; and it believes that maternity and child-welfare services should be able to function without severance, and with full coördination between their institutional, clinical and domiciliary branches. The joint-authority area for Birmingham should, it is felt, be confined to the present area of the city together with such adjacent areas as cannot effectively be absorbed into other joint authorities. The committee regrets the exclusion from a "comprehensive" National Health Service of the industrial medical service, remarking that insufficient emphasis appears to be laid on the intimate connexion between health conditions in industrial establishments and the public health generally. Administration of all measures relating to factory health should, it is argued, be diverted to the Minister of Health.

The report of the mental hospitals committee recommends that the proposed joint authorities should be obliged to appoint special commitees to deal with the Mental Health Service.

# Births, Marriages and Deaths

## BIRTHS

BAILIE.—On Oct. 1, at Belfast, the wife of Captain H. W. C. Bailie, RAMC—a daughter.

BENTALL.—On Sept. 30, at Shrewsbury, the wife of Surgeon Lieutenant A. P. Bentall, RNVR—a daughter.

COOPER.—On Oct. 4, at Ipswich, the wife of Mr. Stanley Cooper, FRCS, Colonial Service, Gold Coast—a son.

CREAN.—On Sept. 30, the wife of Surgeon Commander T. F. Crean, RN—a daughter.

GAUNT.—On Sept. 29, at Stornoway, the wife of Surgeon Lieut.-Commander R. T. Gaunt, RNVR—a daughter.

HOWARD.—On Oct. 1, at Esher, the wife of Dr. A. C. Howard, Colonial Medical Service, Nigeria—a daughter.

MACDONALD.—On Sept. 30, in London, the wife of Brigadier George Macdonald, MD—a daughter.

MARTIN.—On Oct. 1, at Woodchester, the wife of Captain J. K. Martin, RAMC—a son.

MATTHEWS.—On Sept. 29, at Oxford, the wife of Captain Bryan Matthews, RAMC—a son.

WEST.—On Oct. 4, at Edinburgh, the wife of Dr. Ranyard West—a son.

## MARRIAGES

CHALMERS—EVANS.—On Sept. 29, at York, Kenneth M. Chalmers, MB, to C. Mary Evans, MB.

DAVIES—MACMIN.—On Sept. 30, in London, Sydney Vivian Davies, MB, to Barbara Joan Macmin, SRN.

MCNAB—BOGUE.—On Sept. 30, at Appleby, David John Norwell McNab, surgeon lieut.-commander RNVR, of Glasgow, to Kathleen Bogue, ARRC, acting senior sister, QARNNSR.

TINLEY—GRAYBURN.—On Sept. 21, at Lythe, William Edwyn Falkingbridge Tinley, MD, JP, to Kathleen Edith Grayburn.

## DEATHS

BREND.—On Oct. 5, in London, William Alfred Brend, MA CAMB., MD LOND., MRCP, aged 71.

GRAY.—On Oct. 4, at Peterborough, Egerton Gray, MRCS, LSA.

LEDINGHAM.—On Oct. 4, Sir John Charles Grant Ledingham, CMG, MB, D SC ABERD., FRCP, FRS.

NEATBY.—On Sept. 30, at Poole, Thomas Miller Neatby, MA, MD CAMB.

POYNDER.—On Oct. 3, at Simla, India, Louisa Margueretta Poynder, MD LAUSANNE, MRCS, aged 67.

STABB.—On Oct. 3, at Stroud, Arthur Francis Stabb, MB CAMB., FRCP.

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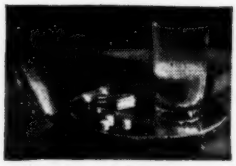

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PRIVATE MENTAL HOME for Nervous and Mental Illness. All forms of treatment available. Fees from 4 gns. per week upwards according to requirements. Vacancies occasionally exist at reduced fees on the recommendation of the patient's own physician.

Apply to Dr. J. A. SMALL. Telephone: Norwich 20080

## CAMBERWELL HOUSE, 33, Peckham Road, London, S.E.5

*Telegrams:* "PSYCHOLIA, LONDON" FOR THE TREATMENT OF MENTAL DISORDERS *Telephone:* RODNEY 4242 (2 lines)

Completely detached Villas for mild cases. Voluntary Patients received. Twenty acres of grounds; own garden produce. Hard and grass tennis courts, putting greens, Recreation Hall with Badminton Court, and all indoor amusements. Occupational therapy, Calisthenics, Actino-therapy, prolonged immersion baths, shock and also modified insulin treatment. Chapel.

Senior Physician, Dr. HUBERT JAMES NORMAN, assisted by a resident Medical Staff and visiting Consultants

An Illustrated Prospectus giving fees, which are strictly moderate, may be obtained upon application to the Secretary

The Convalescent Branch is HOVE VILLA, BRIGHTON and is 200 ft. above sea-level

## THE OLD MANOR, SALISBURY

Telephone: 3216 & 3217

*A Private Hospital for the Care and Treatment of those of both sexes suffering from MENTAL DISORDERS*

Extensive grounds. Detached Villas. Chapel. Garden Produce from own gardens. Terms very moderate.

CONVALESCENT HOME AT BOURNEMOUTH

standing in 12 acres of ornamental grounds, with separate villas, tennis courts, etc. Patients or Boarders may visit the Home by arrangement.

Illustrated Brochure on application to the Medical Superintendent, The Old Manor, Salisbury.

# ST. ANDREW'S HOSPITAL

**FOR NERVOUS AND MENTAL DISORDERS**

## NORTHAMPTON

PRESIDENT: THE MOST HON. THE MARQUESS OF EXETER, K.G., C.M.G., A.D.C.

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., F.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, bio-chemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

### WANTAGE HOUSE

This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods; insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombieres treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-Ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for bio-chemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

### MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

### BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a Park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: No. 2356 and 2357 Northampton), who can be seen in London by appointment.

# VALE OF CLWYD SANATORIUM

This Sanatorium is established for the treatment of Tuberculosis of the Lungs and the Pleural Cavities. It is situated in the midst of a large area of park-land at a height of 450 feet above sea-level. Average rainfall 29·57 per annum. Full day and night Nursing Staffs. X-ray plant. Every facility for Artificial Pneumothorax and for operations on the Chest. Electric Lighting. Central Heating.

For particulars apply to Medical Superintendent.

H. MORRISTON DAVIES, M.D., M.Ch. (Cantab.), F.R.C.S., Llanbedr Hall, Ruthin, N. Wales.

# CALDECOTE HALL

**NUNEATON**

**WARWICKSHIRE**

('Phone: Nuneaton 241)

**Residential treatment of**

## "Nervous Disorders" & Alcoholism

(Certifiable cases are not received)

This beautiful mansion situated in the heart of the country (less than two hours from London by L.M.S.R.) and surrounded by charming pleasure grounds in which games and outdoor occupational therapy are available is devoted to the treatment of Alcoholism and "Nerves" by psychotherapeutic and ancillary methods.

*Illustrated Brochure and particulars obtainable from A. E. CARVER, M.D., D.P.M., Resident Medical Superintendent*

# PECKHAM HOUSE, 112, Peckham Road, London, S.E.15

**Telegrams: "Alleviated, London"** **Telephone: Rodney 2641-2642**

A Private Mental Hospital, for Ladies and Gentlemen suffering from Nervous and Mental Illness, where the amenities of a comfortable home are combined with full investigation and every well-established modern treatment.

Terms from £4.4.0 weekly.

Illustrated Prospectus may be obtained from the Physician Superintendent.

# TOR-NA-DEE SANATORIUM

**Managing Director: DAVID LAWSON, M.D., F.R.S.E.**

**FOR THE TREATMENT OF PULMONARY TUBERCULOSIS AND ALLIED DISEASES**

**Senior Physician and Medical Superintendent: R. Y. KEERS, M.D. (Edin.), F.R.F.P.S. (Glas.).**

For prospectus apply to The Secretary, Tor-na-Dee, Murtle, Aberdeenshire Telephone: Cults 107

# COURT HALL, KENTON, near EXETER

FOR THE TREATMENT OF EIGHT LADIES, VOLUNTARY, TEMPORARY AND CERTIFIED PATIENTS

# CLIFFDEN, TEIGNMOUTH

FOR EARLY AND CONVALESCENT CASES Recreational Therapies are held daily by skilled Leaders

The house stands high with spacious balconies and extensive views of the South Devon Coast. Beautiful garden. Own Dairy in 25 acres. Private road to beach

There is also a charming house, **EBWORTHY, MANATON, DARTMOOR**, situated in 20 acres, 1100 ft. up for bracing moorland air

*Resident Physicians*—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. *Telephones*—STARCROSS 259 and TEIGNMOUTH 289

# CHEADLE ROYAL

**CHEADLE CHESHIRE**

**A Registered Hospital for MENTAL DISEASES, and its Seaside Branch, GLAN-Y-DON, Colwyn Bay, N. Wales**

THE object of this Hospital is to provide the most efficient means for the treatment and care of those of the Upper and Middle Classes suffering from MENTAL and NERVOUS DISEASES. The Hospital is governed by a Committee appointed by the Trustees of the Manchester Royal Infirmary. VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS RECEIVED

**For Terms and further information apply to the MEDICAL SUPERINTENDENT** *Telephone*: GATLEY 2231

## NORTHUMBERLAND HOUSE

**Green Lanes, Finsbury Park, N.4**

A PRIVATE HOSPITAL for the treatment of mental and nervous illnesses. Conveniently situated and easy of access from all parts. Six acres of ground, facing Finsbury Park. Voluntary and Temporary Patients received without certification. E.C.T. Shock therapy, Psychotherapy, and other modern forms of treatment. Air-raid Shelters have been provided. Telephone: STAmford Hill 2688. Telegrams: "Subsidiary, London."

For further particulars apply to the Medical Superintendent, ROBERT M. RIGGALL, Member British Psycho-Analytical Society.

## MALLING PLACE, KENT

For LADIES and GENTLEMEN of Unsound Mind

Terms moderate. Apply to Resident Medical Superintendent. Telegrams: ADAM WEST MALLING. Telephone No. 2: MALLING.

## UNIVERSITY EXAMINATION POSTAL INSTITUTION

**17, RED LION SQUARE, LONDON, W.C.1**

Over 50 years' experience

## POSTAL COACHING FOR ALL MEDICAL EXAMINATIONS

**MEDICAL PROSPECTUS (24 pages)**

sent gratis, along with List of Tutors, &c., on application to the Principal, 17, Red Lion Square, London, W.C.1. (Telephone: HOLborn 8313.)

**L. M. S. S. A.**

FINAL EXAMINATION: SURGERY, 13th November, 4th December, 1944, 8th January, 1945. MEDICINE, PATHOLOGY, 20th November, 11th December, 1944, 15th January, 1945. MIDWIFERY, 21st November, 12th December, 1944, 16th January, 1945. MASTERY of MIDWIFERY EXAMINATIONS, May and November.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

**BRITISH POSTGRADUATE MEDICAL SCHOOL.**

(UNIVERSITY OF LONDON.)

An INTENSIVE COURSE on "MEDICAL DISEASES IN WAR" will be given at the British Postgraduate Medical School from 23RD OCTOBER to 27TH OCTOBER, 1944, inclusive. The subjects will include: Epidemic Jaundice, Mass Radiography, Malaria and Kala-azar, Skin Diseases, Medical Problems in Occupied Countries, Psychiatric Problems, The Naples Typhus Outbreak, Shock, The Control of V.D., Sulphonamides and Penicillin.

The fee for the Course will be 1 guinea, but no fee will be charged in the case of Officers of the Armed Forces who are nominated for the course by their respective Director-Generals. Applications for admission should be addressed to the Dean, British Postgraduate Medical School, Ducane-road, W.12.

Further War Course:—

A Course of Lectures and Practical Demonstrations on the "TREATMENT OF FRACTURES WITH SPECIAL REFERENCE TO WAR CONDITIONS" to be given by Mr. R. WATSON-JONES, M.Ch., F.R.C.S., during the week commencing 6th November, 1944.

The fee for this Course will be 5 guineas to all except Officers of the Armed Forces in uniform.

**MISSION OF HEALING.** The great work of the Christian Medical Missions in India will be described by The Rev. Canon F. A. COCKIN in a broadcast appeal at 8.25 P.M. on Sunday, 15th October. Please listen and send your gift to:

CONFERENCE OF BRITISH MISSIONARY SOCIETIES,
2, Eaton-gate, London, S.W.1.

**THE MOUNT SCHOOL, YORK.**

Boarding School under the management of the Society of Friends.

ENTRANCE AND SCHOLARSHIPS EXAMINATION
FEBRUARY, 1945.

Application should be made immediately to the Headmistress.

**POPLAR HOSPITAL, East India Dock-road, Poplar, E.14.** Applications are invited from registered medical practitioners, Male, including R practitioners who now hold A posts, for the appointment of ASSISTANT RESIDENT MEDICAL OFFICER (B2), vacant 15th October. Appointment will be limited to 6 months. The salary is at the rate of £200 p.a., with full residential emoluments. Knowledge of obstetrics important.

Applications, stating age, nationality, qualifications with dates, and details of previous appointments, if any, accompanied by copies of 3 testimonials, should be sent to—

D. H. LINDSAY, House Governor and Secretary.

**POPLAR HOSPITAL, East India Dock-road, Poplar, E.14.** Applications are invited from registered Male medical practitioners for the appointment of HOUSE SURGEON (A), now vacant. Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.

Applications, stating age, nationality, qualifications with dates, and details of previous appointments, if any, accompanied by copies of 3 testimonials, should be sent to—

D. H. LINDSAY, House Governor and Secretary.

**SAMARITAN FREE HOSPITAL FOR WOMEN,** Marylebone-road, London, N.W.1. Applications are invited from registered medical practitioners (Male and Female) for the appointment of RESIDENT GYNÆCOLOGICAL REGISTRAR (B1), for a period of 6 months (renewable) commencing 15th November, 1944. Salary at the rate of £300 p.a., with board, lodging, and laundry. Suitably qualified R and W practitioners holding B2 posts, also R practitioners holding B1 and have been rejected by the R.A.M.C., may apply.

Applications, stating age, accompanied by copies only of testimonials, should be sent to the Secretary at the Hospital on or before Thursday, 26th October, 1944.

G. H. HAWKINS, Secretary.

**NATIONAL TEMPERANCE HOSPITAL,** Hampstead-road, N.W.1. Applications are invited for the post of HOUSE SURGEON (A) under the E.M.S. The appointment is for a period of 6 months as from 1st November. Salary £120 p.a., with board, residence, and laundry allowance. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating qualifications, age, &c., with copies of not more than 3 testimonials, by 18th October, 1944, addressed to the Secretary.

**THE PRINCE OF WALES'S GENERAL HOSPITAL, London, N.15.** Applications are invited for the appointments of HONORARY CLINICAL ASSISTANTS for the year 1945 in the following Departments of the Hospital:—

Medical; Neurological; Children; Allergy; Skin; Psychiatric; Surgical; Fracture; Gynæcological; Ear, Nose, and Throat; Eye; Genito-urinary; X-ray; Physical Medicine; Dental.

Applications for appointment to any of these posts should be sent on or before Monday, 16th October, 1944, to—

J. C. BURDETT, Director and House Governor.

22nd September, 1944.

**ALBERT DOCK SEAMEN'S HOSPITAL AND FRACTURE CLINIC,** Alnwick-road, E.16. Applications are invited from registered medical practitioners for the appointment of HOUSE PHYSICIAN (B2), vacant 1st November. Salary is at the rate of £200 p.a., with full residential emoluments. R practitioners holding A posts may also apply, when appointment will be limited to 6 months.

Applications, stating age, qualifications with dates, and previous experience, accompanied by copies of recent testimonials, to be sent immediately to—

F. A. LYON, Administrator and Secretary.

Seamen's Hospital Society, Greenwich, S.E.10.

**THE ROYAL CANCER HOSPITAL (FREE)** (Incorporated under Royal Charter), Fulham-road, London, S.W.3. Applications are invited for the post of JUNIOR ASSISTANT RADIOTHERAPIST. Commencing salary £550 p.a. Applicants must be registered medical practitioners who hold a Diploma in Medical Radiology. The appointment will be for a period of 12 months and subject to renewal.

Applications, to be made on a form which will be supplied by the Secretary, together with copies of 3 recent testimonials, should be sent to the Secretary by Monday, 16th October, 1944.

**HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill, N.W.3.** Applications are invited from registered medical practitioners, Male and Female, for the following resident posts, vacant 1st December, 1944, tenable for 6 months:—

JUNIOR MEDICAL OFFICER (B2) at Main Hospital, Hampstead, N.W.3, embracing both surgical and medical work. Salary £133 6s. 8d. p.a., with board, lodging, and laundry.

CASUALTY SURGICAL OFFICER (B2) at Out-patient Department, Camden Town, N.W.1. Salary £100 p.a., with board, lodging, and laundry, plus an allowance at £50 p.a. for duties in connexion with First-Aid Post established there.

Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointments will be temporarily downgraded to A. Practitioners qualified for more than 3 months and liable under the National Service Acts (males must be rejected by R.A.M.C.) may also apply.

Applications on the prescribed form, with copies of 3 testimonials, to be returned not later than 26th October.

KENNETH A. F. MILES, House Governor.

**HAMPSTEAD GENERAL HOSPITAL, The Green, Haverstock** Hill, N.W.3. The Council of Management is prepared to receive applications from registered medical Men and Women for the office of TEMPORARY ANÆSTHETIST, the office to be held for the duration of the war only. Attendance will be required for 2 sessions weekly. There is an honorarium payable of £25 p.a. Candidates must be ineligible for military service.

Applications, stating age, qualifications, experience in anæsthesia, and appointments held, with copies of 3 testimonials, must reach the undersigned, from whom full details of the appointment may be obtained, by 23rd October.

By Order of the Council of Management,

October, 1944. KENNETH A. F. MILES, House Governor.

**BOROUGH OF WALTHAMSTOW. Education Committee.** ASSISTANT SCHOOL MEDICAL OFFICER (temporary). Applications are invited from registered medical practitioners who are exempt from military service for the above whole-time appointment. The salary scale is £600 p.a., rising by £25 p.a. to £700 p.a., plus cost-of-living bonus at the rate of £40 8s. 3d. p.a., plus car allowance. The commencing salary will be at a point on the scale according to experience. The person appointed may be required to assist at the Council's Day Nurseries, Child Welfare Clinics, Infectious Disease and/or Maternity Hospitals. Suitable experience will therefore be an advantage.

Applications must be made on the approved form obtainable from the undersigned, to whom it must be returned by NOON on Saturday, 21st October, 1944.

E. GWYN THOMAS, Director of Education.

Town Hall, Forest-road, Walthamstow, E.17,
19th September, 1944.

# HIS MAJESTY'S COLONIAL SERVICE

## THE COLONIAL MEDICAL SERVICE

### VACANCIES FOR MEDICAL OFFICERS

The maintenance of an efficient Colonial Medical Service constitutes a vital part of the national war effort and it is most important that the Service should be assured of an adequate supply of doctors.

The Secretary of State for the Colonies therefore invites applications from doctors possessing a medical qualification registrable in the United Kingdom who are British subjects and who are under thirty-five years of age.

Medical Officers are appointed in the first instance for general service. But there are ample opportunities for work in special branches of medicine and surgery, in public health and in medical research.

The normal salary scale is from £600 to between £1,000 and £1,120. There are large numbers of super-scale posts to which promotion is made on merit and which carry higher salaries.

Government quarters, in many cases free of rent, and first-class passages to and from the Colonies are provided, and an adequate pension scheme is in force.

Selected candidates are normally required to attend a course of instruction in Tropical Medicine and Hygiene either before proceeding overseas or during their first period of leave.

Further particulars, including the regulations governing admission to the Colonial Medical Service, may be obtained from the Director of Recruitment (Colonial Service), 2, Park-street, London, W.1.

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**CONNAUGHT HOSPITAL, Orford-road, Walthamstow, E.17.** (118 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), vacant 1st November, 1944. The post is suitable for applicants wishing to sit for the Fellowship examinations. Salary at the rate of £120 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.

Applications to be sent as soon as possible to—

R. HALTON HARRISON, Secretary.

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**VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea,** S.W.3. Applications are invited from registered medical practitioners. Male and Female, for the appointment of HOUSE PHYSICIAN (A), vacant 1st December, 1944, including practitioners within 3 months of qualification and liable under the National Service Acts. The appointment is for a period of 6 months. Salary at the rate of £150 p.a.

Applications should reach the Secretary not later than the first post on Thursday, 26th October, 1944.

D. ST. JOHN BAMFORD, Secretary.

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**VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea,** S.W.3. Applications are invited from registered medical practitioners for the appointment of RESIDENT MEDICAL OFFICER (B1) for a period of 6 months from 1st December, 1944. Applicants should have held house appointments and had surgical experience. Salary is at the rate of £250 p.a. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications should be sent not later than the first post on Thursday, 26th October, to: D. ST. J. BAMFORD, Secretary.

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**BRITISH POSTGRADUATE MEDICAL SCHOOL.** (University of LONDON.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A), vacant 1st December, 1944. The appointment is for 6 months. The salary is at the rate of £105 p.a., plus full residential emoluments. Practitioners liable to service under the National Service Acts and who have not yet completed 3 months since date of qualification may apply.

Apply to the Dean, British Postgraduate Medical School, Ducane-road, W.12, before 6th November, 1944.

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**THE ELIZABETH GARRETT ANDERSON HOSPITAL,** Euston-road, N.W.1.

At The Elizabeth Garrett Anderson Hospital.

Applications are invited from registered medical practitioners, Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the post of HOUSE SURGEON (A), vacant 1st December, 1944. Appointment will be for a period of 6 months. Salary is at the rate of £100 p.a., with full residential emoluments.

At Oster House E.M.S. Hospital, St. Albans.

Applications are invited from registered medical practitioners, Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the post of HOUSE SURGEON (A), vacant 1st December, 1944. Appointment will be for a period of 6 months. Salary is at the rate of £100 p.a., with full residential emoluments.

Applications for the above appointments, with 2 copies of each of 3 testimonials, should be sent to the Secretary of The Elizabeth Garrett Anderson Hospital by 30th October.

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**THE NELSON HOSPITAL, Merton, S.W.20. Applications are** invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (A), now vacant. Salary at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months; otherwise may be extended.

Applications to the Secretary.

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**THE LONDON CHEST HOSPITAL, E.2. Applications are invited** for the post of RESIDENT MEDICAL OFFICER (B1) as from the 1st January, 1945. The appointment is for 6 months. Salary at the rate of £350 p.a., with board and lodging. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications to be sent not later than Monday, 20th November, 1944, to: THOS. BROWN, Secretary.

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**THE LONDON CHEST HOSPITAL, E.2. Applications are invited** for the post of RESIDENT MEDICAL OFFICER (B1) at the Hospital's Country Branch at Camberley, Surrey, as from 1st January, 1945. The appointment is for 6 months. Salary at the rate of £350 p.a., with board and lodging. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications to be sent not later than Monday, 20th November, 1944, to: THOS. BROWN, Secretary.

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**KING EDWARD MEMORIAL HOSPITAL, Ealing. Applications** are invited from registered medical practitioners, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of HOUSE SURGEON (A) to Special Departments (Gynæcological, E.N.T., &c., including Anæsthetics), vacant now. 6 months' appointment. Salary at the rate of £150 p.a., with full residential emoluments.

Applications, stating age, nationality, qualifications with dates, and details of experience, together with copies of 2 recent testimonials, should be sent immediately to—

R. A. MICKELWRIGHT, House Governor.

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**COUNTY BOROUGH OF WEST HAM. Dagenham Sanatorium.** Appointment of TEMPORARY ASSISTANT MEDICAL OFFICER (Resident). Applications are invited from male or female practitioners for the post of Temporary Assistant Medical Officer (B1) at Dagenham Sanatorium (128 Beds). Suitably qualified R and W practitioners holding B2 appointments are invited to apply. Applications from R and W practitioners now holding B1 appointments cannot be considered unless they have been rejected by the R.A.M.C. In accordance with the Council's resolution this appointment will, in the first instance, be temporary for the duration of the war, but can be terminated by 1 month's notice on either side.

The salary for the post is £350 p.a., rising by annual increments of £25 to a maximum of £450 p.a. plus a temporary war bonus, with quarters, full board and laundry.

Candidates must be registered medical practitioners, and preference will be given to those who have had some experience of tuberculosis work in addition to general hospital experience. The person appointed will be in charge of the hospital during the absence of the Medical Superintendent, and will be required to undertake such other hospital or clinic duties in connection with tuberculosis work as may from time to time be prescribed by the Medical Officer of Health.

The appointment will be subject to the Council's regulations regarding holidays, sick pay, etc., and the successful candidate will be required to pass a medical examination.

Forms upon which application must be made can be obtained from the Medical Officer of Health, 223–225, Romford Road, E.7, on receipt of a stamped addressed envelope, and should be returned to the undersigned not later than 30th October, 1944.

Canvassing members of the Council is prohibited and will disqualify. CHARLES E. CRANFIELD, Town Clerk.

Town Hall, West Ham, E.15, 12th October, 1944.

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**MIDDLESEX COUNTY COUNCIL. Springfield Mental Hospital,** London, S.W.17. Temporary Male British ASSISTANT MEDICAL OFFICER (B1), unestablished, required at the above Mental Hospital. Salary £400 p.a., plus current war bonus £25 p.a. and full residential emoluments. Previous mental experience not essential. Suitably qualified R practitioners holding B2 appointments, also those now holding B1 and who have been rejected by the R.A.M.C., may apply.

Applications, stating age, qualifications, and experience, together with copies of testimonials, should be sent at once to the Medical Superintendent.

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**MIDDLESEX COUNTY COUNCIL. Resident Junior Assistant** MEDICAL OFFICER (B2) for *medical* duties required at Hillingdon County Hospital, near Uxbridge, Middlesex. Applications invited from registered medical practitioners, including R practitioners who now hold A posts. Salary £250 p.a., plus cost-of-living bonus. Board, lodging, and laundry. Whole-time duties, such as Council may require, under supervision of Medical Director. Appointment is for 6 months, but may be extended for further 6 months (except in case of R practitioners). Post vacant 1st November.

Applications, stating age, nationality, qualifications, present post and previous experience, enclosing copies of not more than 3 recent testimonials, to the Medical Director, "B3," of Hospital. Application forms not provided. Closing date 20th October, 1944. C. W. RADCLIFFE, Clerk of the County Council.

Middlesex Guildhall, Westminster, S.W.1.

**MIDDLESEX COUNTY COUNCIL.** Resident Junior Assistant MEDICAL OFFICER (B2) for *surgical* duties, required at Hillingdon County Hospital, near Uxbridge, Middlesex. Applications invited from registered medical practitioners, including R practitioners who now hold A posts. Salary £250 p.a., plus cost-of-living bonus. Board, lodging, and laundry. Whole-time duties, such as Council may require, under supervision of Medical Director. Appointment is for 6 months, but may be extended for further 6 months (except in case of R practitioners). Post vacant 11th December, 1944.

Applications, stating age, nationality, qualifications, present post and previous experience, enclosing copies of not more than 3 recent testimonials, to the Medical Director, "B3," of Hospital. Application forms not provided. Closing date 20th October, 1944. C. W. RADCLIFFE, Clerk of the County Council.

Middlesex Guildhall, Westminster, S.W.1.

**MILLER GENERAL HOSPITAL, Greenwich High-road, S.E.10.** Applications are invited from registered medical practitioners for the appointment of SURGICAL REGISTRAR AND DEPUTY RESIDENT SURGICAL OFFICER (B1), vacant 15th November, 1944. Applicants should have held house appointments and had surgical experience. Salary is at the rate of £350 p.a., with full residential emoluments, subject to appointment by E.M.S. Suitably qualified R practitioners holding B2 appointments, also those holding B1 and rejected by the R.A.M.C., may apply.

Applications, giving full details, together with copies of 3 testimonials, should reach the Secretary not later than 31st October, 1944.

5th October, 1944.

**WOOLWICH MEMORIAL HOSPITAL, Shooters Hill, London, S.E.18.** Applications are invited for the appointment of HONORARY ASSISTANT PHYSICIAN (Acting) and should be sent to the Secretary, at the Hospital, to reach him not later than 20th October, 1944.

**KING GEORGE HOSPITAL, Ilford (near London.)** Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), vacant 1st January, 1945. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Salary is at the rate of £550. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Applications, stating age, nationality, qualifications with dates, experience and details of previous appointments, and accompanied by copies of 3 recent testimonials, should be sent to—G. AUSTIN HEPWORTH, Secretary and Superintendent.

**KING GEORGE HOSPITAL, Ilford.** Applications are invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of 2 HOUSE SURGEONS (A), vacant 1st November and 1st December, 1944, respectively. The appointments will be for a period of 6 months. Salary is at the rate of £120 p.a., with full residential emoluments.

Applications, with testimonials, should be sent as soon as possible to: G. AUSTIN HEPWORTH, Secretary and Superintendent.

**EXMINSTER HOSPITAL, Devon.** Applications are invited from registered medical practitioners, Male and Female, for the following appointment. It is desirable that candidates should be interested in Orthopædic work, as Exminster Hospital is a Fracture A Hospital and has 200 fracture and orthopædic Beds :—

RESIDENT HOUSE SURGEON (B2). The salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months, otherwise can be for a period of 1 year.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent as soon as possible to the Medical Superintendent, Exminster Hospital, Exminster, near Exeter, Devon.

**YORK MATERNITY HOSPITAL.** Applications are invited from registered Female practitioners, including W practitioners who now hold A posts, for the appointment of OBSTETRIC HOUSE SURGEON (B2), vacant 1st November. There is a Senior Medical Officer in charge. Duties will consist of work at the Maternity Hospital, attendance at clinics, and such other duties as may be prescribed by the Medical Officer of Health. The appointment will be for 6 months and is subject to the Council's Sick Allowance Regulations. Salary at the rate of £200 p.a., with full residential emoluments. A war bonus of 7s. 9d. per week is also paid.

Applications, with testimonials, should be submitted to—

C. B. CRANE, M.B., D.P.H.,
Acting Medical Officer of Health.

Health Department, 50, Bootham, York.

**THE JESSOP HOSPITAL FOR WOMEN, Sheffield.** Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (B2), now vacant. Salary at the rate of £100 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply, when appointment will be limited to 6 months. Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent to—

DAVID OSWALD, Superintendent and Secretary.

**ROYAL SUSSEX COUNTY HOSPITAL, Brighton.** (375 Beds.) Applications are invited from registered medical practitioners (Male or Female), including practitioners within 3 months of qualification and liable under the National Service Acts, for the post of HOUSE SURGEON (A), now vacant. The salary attached to the post is £175 p.a., with full residential emoluments. To R and W practitioners the appointment will be for a period of 6 months; otherwise will be for a period of at least 6 months.

Applications should be sent to the Secretary-Superintendent.

**GRIMSBY AND DISTRICT GENERAL HOSPITAL.** (237 Beds, 1A.) Applications are invited from registered medical practitioners, Male and Female, for the following appointments :—

RESIDENT ORTHOPÆDIC OFFICER (B2). Appointment for 6 months. The salary is at the rate of £275 p.a., with full residential emoluments. R and W practitioners holding A posts may also apply.

HOUSE PHYSICIAN (A). Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for 6 months.

RESIDENT CASUALTY OFFICER AND HOUSE SURGEON (A). Appointment for 6 months. Salary at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, nationality, qualifications, and copies of recent testimonials, to the Secretary-Superintendent.

**SWANSEA GENERAL AND EYE HOSPITAL.** Applications are invited from registered medical practitioners, Male and Female, for the undermentioned posts :—

HOUSE SURGEON (A), now vacant.
HOUSE SURGEON (A), vacant 1st November.
HOUSE PHYSICIAN (A), vacant 1st December.

Salary for each appointment is at the rate of £165 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointments will be for a period of 6 months.

Applications should be forwarded to—

O. C. HOWELLS, Secretary-Superintendent.

**THE ROYAL PORTSMOUTH HOSPITAL, Portsmouth.** Applications are invited from registered medical practitioners (Male), including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of CASUALTY OFFICER (A). 6 months' appointment. Salary £150 p.a., with full residential emoluments.

Applications, stating age, qualifications, nationality, and copies of testimonials, to be sent to: B. WAGSTAFF, Secretary.

**WORCESTER ROYAL INFIRMARY.** Applications are invited for the position of HOUSE SURGEON (A), vacant 7th December. The salary will be at the rate of £120 a year, with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, with copies of not more than 3 testimonials, should be addressed to—

HAROLD WIGG, Acting Superintendent-Secretary.

**WORCESTER ROYAL INFIRMARY.** Applications are invited for the position of HOUSE PHYSICIAN (B2), vacant 3rd November. The salary will be at the rate of £200 a year, with full residential emoluments. R and W practitioners holding A posts may also apply, when appointment will be limited to 6 months.

Applications, with copies of not more than 3 testimonials, should be addressed to—

HAROLD WIGG, Acting Superintendent-Secretary.

**THE ROYAL HOSPITAL, Wolverhampton.** (Incorporated under Royal Charter. (310 Beds.) Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (B2), Fracture and Orthopædic Department, vacant forthwith. Salary is at the rate of £150 p.a. with full residential emoluments. R practitioners who now hold A posts may also apply, when appointment will be limited to 6 months.

9th October, 1944. W. COCKBURN, House Governor.

**CITY OF CHESTER. City Hospital.** Applications are invited from Female registered medical practitioners for the appointment of JUNIOR RESIDENT MEDICAL OFFICER (A) at the above Hospital. Salary at the rate of £200 p.a., with full residential emoluments and temporary war bonus. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months; otherwise will not exceed 1 year.

Applications to be sent to the Medical Officer of Health, Town Hall, Chester, immediately.

**GRAVESEND AND NORTH KENT HOSPITAL, Kent.** Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (A), vacant 1st November, 1944. Salary at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications should be sent as soon as possible to—

C. E. CHAPMAN, Secretary-Superintendent.

**THE CHESTER ROYAL INFIRMARY.** (225 Beds.) Applications are invited from registered medical practitioners (Male and Female) for 2 appointments of GENERAL HOUSE SURGEON (A). Salary is at the rate of £150 p.a., with full residential emoluments. The appointments will become vacant on the 8th and 15th November respectively. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent not later than 1st November to the Secretary.

**NORTHAMPTON GENERAL HOSPITAL.** (408 Beds.) Applications are invited immediately from registered medical practitioners, Male and Female, for the appointment of CASUALTY OFFICER (A). Salary at rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

GORDON S. STUBTRIDGE.

**CITY OF LONDON MENTAL HOSPITAL, Stone, near Dartford, KENT.** Wanted LOCUM TENENS at the above Hospital. Salary 10 guineas per week, plus residential emoluments.

Applications, stating age and qualifications, should be sent as soon as possible to the Medical Superintendent.

**CITY OF MANCHESTER. Withington Hospital. (1150 Beds.)** Applications are invited from registered medical practitioners, Male and Female, for the appointment of TEMPORARY RESIDENT ASSISTANT OBSTETRICAL OFFICER (B1), vacant 1st January, 1945. The appointment will be temporary for the duration of the war. Candidates should have had previous experience in midwifery. The basic cash salary scale commences at £350 p.a. and rises by annual increments of £25 to a maximum of £450, plus a temporary cost-of-living wages addition, with board, residence, and laundry in addition, subject to the Manchester Corporation conditions of service. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box No. 399, Town Hall, Manchester, 2, and applications for the post must be received by him not later than 31st October, 1944. Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 2nd October, 1944.

**THE ST. HELENS HOSPITAL. Applications are invited for the** following appointments :—

HOUSE SURGEON (B2). R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months. Salary £225 p.a.

HOUSE SURGEON (A). Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months. Salary £150 p.a.

Both appointments carry full residential emoluments. Both positions now vacant.

Applications to be submitted to : GEORGE HARPER, Secretary.

**ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.** (255 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of CASUALTY OFFICER AND HOUSE SURGEON (A) to the E.N.T. Department. The appointment will be for a period of 6 months. Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

EDWARD L. WIRGMAN, House Governor and Secretary.

**COUNTY BOROUGH OF PRESTON. Sharoe Green Hospital.** (250 Beds.) Applications are invited from registered medical practitioners, Female, for the appointment of JUNIOR RESIDENT MEDICAL OFFICER (A), vacant 4th December, 1944. Salary is at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months ; otherwise it will not exceed 1 year.

Applications, stating age, qualifications with dates, nationality, and accompanied by copies of 3 recent testimonials, should be forwarded to the Medical Superintendent, Sharoe Green Hospital, Fulwood, Preston.

**COUNTY BOROUGH OF DEWSBURY. With the consent of** the Minister of Health, applications are invited from registered medical practitioners (either sex) for the appointment of TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. The salary is £500 p.a., rising by annual increments of £25 to a maximum of £700, plus present cost-of-living bonus. In fixing the commencing salary, the Committee will consider previous experience.

Further particulars, and application form, may be obtained from the Medical Officer of Health, Municipal Buildings, Dewsbury, to whom completed forms should be returned as soon as possible.

Town Hall, Dewsbury. HOLLAND BOOTH, Town Clerk.

**CITY OF BIRMINGHAM. Little Bromwich Infectious Disease** HOSPITAL. Applications are invited from registered medical practitioners, Male and Female, for the post of JUNIOR MEDICAL OFFICER (A) at Little Bromwich Infectious Disease Hospital. The salary will be at the rate of £300 p.a., plus residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months ; otherwise for 1 year.

Applications, stating age, nationality, qualifications, and experience, and accompanied by copies of 3 recent testimonials, should be addressed to the Medical Officer of Health, Public Health Department, Birmingham, 3, to reach him not later than the 26th October, 1944.

**CITY OF BIRMINGHAM. Dudley Road and Selly Oak Hospitals.** Applications are invited from registered medical practitioners, Male and Female, for the posts of JUNIOR MEDICAL OFFICER (A) (House Physicians). The salary will be at the rate of £200 p.a., plus residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointments will be for a period of 6 months ; otherwise for 1 year.

Applications, stating age, nationality, qualifications, and experience, and accompanied by copies of 3 recent testimonials, should be addressed to the Medical Officer of Health, Public Health Department, Birmingham, 3, to reach him not later than the 26th October, 1944.

**REEDYFORD MEMORIAL HOSPITAL, Nelson, Lancs. Applica**tions are invited for the appointment of HONORARY SURGEON to the Ear, Nose, and Throat Department of the above Hospital. The appointment, although intended to be of a permanent nature, will be subject to review at the end of the war in accordance with the request of the British Medical Association. The Honorary Surgeon appointed will be permitted to act as Consultant in private cases.

Applications, with testimonials, should be addressed to Sir JAMES AITKEN, Honorary Secretary, Reedyford Memorial Hospital, Nelson, the envelope to be endorsed "Honorary Surgeon."



**COUNTY BOROUGH OF WALSALL. Manor Hospital. Appli**cations are invited from registered medical practitioners, Male and Female, for the following appointments :—

RESIDENT MEDICAL OFFICER (B1). Salary £350 p.a., rising by annual increments of £25 to £450 p.a., together with the usual residential emoluments. The appointment is superannuable and is subject to medical examination. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners now holding B1 and having been rejected by the R.A.M.C., may apply.

RESIDENT ANÆSTHETIST (B2). The salary is at the rate of £350 p.a., rising by £25 to £425 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months ; otherwise for a period not exceeding 4 years.

The officers appointed will act under the direction of the Medical Superintendent, and perform such other duties as may be required.

Applications should be sent as soon as possible to—

JAMES A. M. CLARK, Medical Officer of Health.

Council House, Walsall, 3rd October, 1944.

**BIRMINGHAM ACCIDENT HOSPITAL AND REHABILITATION** CENTRE. Applications are invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of HOUSE SURGEON (A), vacant 8th November, 1944. Appointment will be for 6 months. Salary is at the rate of £150 p.a., with full residential emoluments.

3rd October, 1944. A. A. MACIVER, Secretary.

**BIRMINGHAM ACCIDENT HOSPITAL AND REHABILITATION** CENTRE. Applications are invited from registered medical practitioners, Male and Female, including R and W practitioners who now hold A posts, for the appointment of HOUSE SURGEON (B2) for the Medical Research Council Burns Unit, now vacant. The appointment will be for 6 months. The salary is at the rate of £150 p.a., with full residential emoluments.

3rd October, 1944. A. A. MACIVER, Secretary.

**TORBAY HOSPITAL, Torquay. (223 Beds.) Applications are** invited from registered medical practitioners, Male and Female, for appointment on 20th November as HOUSE PHYSICIAN (A). Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for 6 months ; otherwise for 6 months renewable at the pleasure of the Committee.

Applications, with full particulars, to—

30th September, 1944. E. L. GRIST, Secretary.

**COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE.** OTLEY COUNTY HOSPITAL. (296 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT MEDICAL OFFICER (A). Salary is at the rate of £120 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months ; otherwise not exceeding 1 year.

Applications should be submitted to the County Medical Officer, County Hall, Wakefield.

BERNARD KENYON, Clerk of the County Council.

County Hall, Wakefield, October, 1944.

**EAST SUFFOLK AND IPSWICH HOSPITAL. (400 Beds.) Appli**cations are invited from registered medical practitioners for the following posts :—

HOUSE SURGEON (B2) to the Orthopædic and Fracture Department, vacant 24th November. R practitioners who now hold A posts may apply.

HOUSE SURGEON (A) (General Surgery and Head Injuries) and HOUSE SURGEON (A) to the Gynæcologist, both vacant 9th December. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Appointments will be for 6 months. Salary is at the rate of £175 p.a., with full residential emoluments.

ARTHUR GRIFFITHS, Secretary.

The Hospital, Ipswich, 14th October, 1944.

**WARNEFORD GENERAL HOSPITAL, Leamington Spa. Applic**ations are invited from registered medical practitioners, Male and Female, for the post of HOUSE PHYSICIAN AND OPHTHALMIC HOUSE SURGEON (A). Salary is at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent to : J. R. LONG, House Governor and Secretary.

**ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.** (255 Beds.) Applications are invited from registered medical practitioners, Male and Female, including R and W practitioners now holding A posts, for the appointment of HOUSE PHYSICIAN (B2), vacant 1st November, 1944. The appointment will be for a period of 6 months. The salary is at the rate of £175 p.a., with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

EDWARD L. WIRGMAN, House Governor and Secretary.

**ORKNEY COUNTY COUNCIL. Medical Officer for Papa** WESTRAY. Applications are invited from registered medical practitioners to fill the vacancy in the above medical service area. The total emoluments, including grants from Orkney County Council, the Department of Health, and from National Health Insurance, amount to approximately £480 p.a. Some private practice is available and a free house is provided at Papa Westray, the practitioners appointed being responsible for the occupier's rates.

Applications, stating name and address, age, qualifications and experience, together with a copy of 3 recent testimonials, should be lodged with the subscriber on or before 31st October, 1944. DOUGLAS M. WOOD, County Clerk.

County Offices, Kirkwall, 26th September, 1944.

**LANCASHIRE COUNTY COUNCIL. Wrightington Hospital, near WIGAN.** Applications invited for JUNIOR RESIDENT MEDICAL OFFICER (B2) at the Wrightington Hospital, containing 280 Beds for non-pulmonary tuberculosis (adults and children), 20 Beds for "combined" pulmonary and non-pulmonary cases, and 70 Beds for pulmonary cases. The medical staff consists of Medical Superintendent, 3 Assistants, 2 Consultant Orthopædic Surgeons, and other visiting surgeons. Excellent facilities for reading for M.D. Salary £300 p.a., plus bonus, together with board, single quarters, and laundry. R and W practitioners who now hold A posts may apply, when appointment will be limited to 6 months; otherwise 1 year.

Forms of application and conditions of appointment from Central Tuberculosis Officer, County Offices, Preston. Mark letters "Wrightington M.O."

**HUDDERSFIELD ROYAL INFIRMARY. (321 Beds.) Resident** ANÆSTHETIST AND ASSISTANT CASUALTY OFFICER (A), required to commence shortly. Salary at the rate of £150, with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications should be sent as soon as possible to—

H. J. JOHNSON, General Superintendent and Secretary.

**CITY AND COUNTY OF NEWCASTLE UPON TYNE. Shotley** BRIDGE EMERGENCY HOSPITAL: (900 Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointments of HOUSE SURGEONS (A) now vacant. The appointments will be for a period of 6 months. Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications to be forwarded to the Medical Officer of Health, Town Hall, Newcastle upon Tyne, 1.

**WESTON-SUPER-MARE GENERAL HOSPITAL. (100 Beds.)** Applications are invited from medical practitioners (Male and Female) for the appointment of HOUSE SURGEON (A), duties to commence immediately. Salary is at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be addressed to: LESLIE J. FURSLAND, Secretary.

**ROCHDALE INFIRMARY, Lancs. (110 Beds.) The Board of** Management invites applications from registered medical practitioners for the appointment of SECOND HOUSE SURGEON (A). Salary £150, with full residential emoluments. The successful candidate must be a member of a Medical Defence Society. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to: W. WYNNE, Superintendent and Secretary.

**MANSFIELD AND DISTRICT GENERAL HOSPITAL, Notts.** (189 Beds and 89 E.M.S. Beds.) Applications are invited from registered medical practitioners for the appointments of HOUSE SURGEON (A) and HOUSE PHYSICIAN (A), both posts now vacant. Salary for each is at the rate of £220 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointments will be for a period of 6 months.

Applications should be sent immediately to—

K. L. WARD, Secretary.

**YORK COUNTY HOSPITAL. (222 Beds.) Applications are invited** from registered medical practitioners, Male or Female, for the appointment as HOUSE SURGEON (A), vacant 24th October, 1944, whose main duties are in the Eye, Ear, Nose, and Throat Department (37 Beds, with busy Out-patient Clinics), but who will share in the general work of the Hospital, also Casualty duty. Salary is at the rate of £175 p.a., with full residential emoluments. This post is recognised for D.O.M.A. and D.L.O. examinations. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to be sent immediately to—

J. R. MACKRILL, Secretary.

**YORK COUNTY HOSPITAL. (222 Beds.) Applications are invited** from registered medical practitioners, Male and Female, for the appointment of an ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (B2), vacant 21st October, 1944. The salary is at the rate of £175 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months.

Applications to be sent immediately to—

J. R. MACKRILL, Secretary.

**FALMOUTH AND DISTRICT HOSPITAL, Falmouth. (Voluntary** Hospital—50 Beds and 39 Emergency.) Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (A). Salary is at the rate of £260, with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent to: JOHN E. MILLETT, Secretary.

**ROTHERHAM HOSPITAL. (General Voluntary Hospital—** 140 Beds.) Applications are invited from registered medical practitioners (Male or Female) for the appointment of SECOND CASUALTY OFFICER AND HOUSE SURGEON (A) to Ear, Nose, and Throat and Eye Departments, vacant 1st November, 1944. Salary £225 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when the appointment will be for 6 months.

Applications should be sent at once to the Secretary-Superintendent.

**NOTTINGHAM GENERAL HOSPITAL. (712 Beds, including** E.M.S. Beds.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), duties to commence on or about 11th November. Salary at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to be addressed to the undersigned, stating age, qualifications, experience, &c., together with copies of testimonials.

HENRY M. STANLEY,
House Governor and Secretary.

**NOTTINGHAM GENERAL HOSPITAL. Applications are invited** from registered medical practitioners (Male and Female) for the appointment of RESIDENT CASUALTY OFFICER (A) for the above Hospital. Duties to commence on or about 23rd October, 1944. Salary at the rate of £200 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—

HENRY M. STANLEY, House Governor and Secretary.

**GENERAL HOSPITAL, Nottingham. (794 Beds, including E.M.S.** Beds.) SECOND PATHOLOGIST (whole time) required, experienced in histology and morbid anatomy. Temporary appointment with possibility of confirmation after the war. Commencing salary £900 p.a.

Apply, with copies of testimonials, giving details of experience and qualifications, to House Governor and Secretary, General Hospital, Nottingham.

**EAST SUFFOLK AND IPSWICH HOSPITAL, Ipswich. (400** Beds.) Applications are invited from registered medical practitioners for the following posts:—

HOUSE PHYSICIAN (B2), vacant 1st November, 1944.

HOUSE SURGEON (B2) to the Senior Surgeon, vacant now.

R practitioners who now hold A posts may apply.

HOUSE SURGEON (A), vacant 1st November. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Appointments will be for 6 months in each case, and the salary is at the rate of £175 p.a., with full residential emoluments.

ARTHUR GRIFFITHS, Secretary.

The Hospital, Ipswich, 30th September, 1944.

**ROYAL INFIRMARY, Preston. Applications are invited from** registered medical practitioners (including practitioners within 3 months of qualification and liable under the National Service Acts) for the following posts:—

HOUSE SURGEON (A) to Consulting Surgeon (recognised for the F.R.C.S. examination).

HOUSE SURGEON (A) to Ophthalmic and Aural Departments with some duties in medical wards (recognised for the D.O.M.S. and D.L.O. examinations).

Salary in each case at the rate of £150 p.a., with full residential emoluments. 6 months' appointment.

Applications, with full details, to be sent to the Superintendent.

**BLACKBURN AND EAST LANCASHIRE ROYAL INFIRMARY.** (248 Beds—5 Residents.) Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (A), vacant 1st November. Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.

Applications, stating age, qualifications, and nationality, together with copies of 3 testimonials, to be sent as early as possible to—

T. DEWHURST, General Superintendent and Secretary.
Blackburn Royal Infirmary.

**COUNTY BOROUGH OF BLACKBURN. Applications are** invited from registered medical practitioners (Male or Female) for the post of RESIDENT JUNIOR ASSISTANT MEDICAL OFFICER (A) at Queen's Park Hospital and Institution, Blackburn, at a salary of £250 p.a., together with board, apartments, and attendance. The appointment will be limited to a term not exceeding 1 year, or a period of 6 months if held by a practitioner within 3 months of qualification and liable under the National Service Acts, who may apply.

Further particulars may be obtained from the Public Assistance Officer, Cardwell-place, Blackburn, to whom applications, stating age, qualifications, and experience, accompanied by copies of 3 recent testimonials, must be sent.

CHAS. S. ROBINSON, Town Clerk.

**SWANSEA GENERAL AND EYE HOSPITAL. Applications are** invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), vacant 1st November, 1944. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Salary is at the rate of £300, plus 10% war bonus and £200 p.a. for V.D. work. Suitably qualified R practitioners holding B2 appointments, also those now holding B1 and have been rejected by the R.A.M.C., may apply.

Applications should be forwarded to—

O. C. HOWELLS, Secretary-Superintendent.

**ST. BARTHOLOMEW'S HOSPITAL, Rochester. (201 Beds.)** Applications are invited from registered medical practitioners, Male, for the appointment of CASUALTY OFFICER (A), now vacant. The appointment is for 6 months and the salary is at the rate of £150 p.a., with additional war-time distribution of approximately £50 p.a. and full residential emoluments. Practitioners within 3 months of qualification who are liable for National Service may apply.

Applications, stating full particulars, together with copies of recent testimonials, to be forwarded as soon as possible.

T. RHODES, Superintendent-Secretary.

**COUNTY BOROUGH OF DEWSBURY.** The Council, with the approval of the Minister of Health, invite applications from registered medical practitioners holding a Diploma in Public Health for the vacancy of TEMPORARY DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY SCHOOL MEDICAL OFFICER. Salary £700, plus bonus (male £49 8s., female £40 6s.). Terms and conditions of the appointment, together with application form, may be obtained from the Medical Officer of Health, Municipal Buildings, Halifax-road, Dewsbury, to whom applications, accompanied by copies of 3 recent testimonials, should be delivered as soon as possible. The appointment will be subject to the approval of the Minister of Health and the provisions of the Local Government Superannuation Act, 1937. It will be terminated by 3 months' notice on either side.

The person appointed will be required to pass a medical examination, to devote his or her time to the duties of the appointment, and to reside in this borough.

HOLLAND BOOTH, Town Clerk.

Town Hall, Dewsbury, 29th September, 1944.

**CORPORATION OF KIRKCALDY.** Applications are invited from registered medical practitioners (Female) for appointment as TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH. Applicants should possess a Diploma in Public Health and must have experience in the treatment of venereal diseases in women. General duties include school medical inspection and child welfare work. The salary will be at the rate of £500 to £700, by annual increments of £25, plus a war advance, at present £40 8s. 3d. p.a., but the initial placing on this scale will be determined by the experience and qualifications of the successful applicant.

Applications, stating age, experience, and qualifications, together with copies of 2 recent testimonials, should be forwarded to the Medical Officer of Health, Kirkcaldy, not later than Thursday, 26th October, 1944.

The filling of this vacancy is authorised by the Secretary of State for Scotland.

October, 1944. JOHN H. MCLUSKY, Town Clerk.

**BECKETT HOSPITAL AND DISPENSARY, Barnsley.** House SURGEON (A). Applications are invited from registered medical practitioners for this appointment. Salary is at the rate of £225 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when the appointment will be for 6 months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be sent immediately to— ARTHUR L. BOURNE,

27th September, 1944. Secretary-Superintendent.

**THE PRINCE OF WALES'S HOSPITAL, Plymouth.** Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON (A) for duty at the Devonport Section, vacant immediately. Salary is at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

ARTHUR R. CASH, General Superintendent.

Head Office, Greenbank-road, Plymouth,
27th September, 1944.

**THE PRINCE OF WALES'S HOSPITAL, Plymouth.** Applications are invited from registered medical practitioners (Male and Female) for the appointment of SENIOR HOUSE SURGEON (B2) for duty at the Devonport Section, vacant 31st October. Salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months.

ARTHUR R. CASH, General Superintendent.

Head Office, Greenbank, Plymouth.

**COVENTRY AND WARWICKSHIRE HOSPITAL.** Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A). The post, which is for 6 months, is vacant immediately. Salary at the rate of £170 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of 3 recent testimonials, should be addressed immediately to—

S. CECIL HILL, House Governor and Secretary.

**ROYAL BERKSHIRE HOSPITAL, Reading.** Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT MEDICAL OFFICER (A) (Blagrave Branch Hospital) and ASSISTANT to Pathologist as from the 1st December, 1944. Salary is at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

H. E. RYAN, Secretary and House Governor.

**ROYAL BERKSHIRE HOSPITAL, Reading.** Applications are invited from medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (B2) to the Gynæcological and Obstetric Department, vacant 1st December, 1944. Salary is at the rate of £200 p.a., with full residential emoluments. R and W practitioners who now hold A posts may apply, when the appointment will be limited to 6 months.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of 3 recent testimonials, should be sent immediately to—

H. E. RYAN, Secretary and House Governor.

**CAMBORNE-REDRUTH MINERS' AND GENERAL HOSPITAL,** REDRUTH, CORNWALL. Applications are invited for the post of RESIDENT OBSTETRIC OFFICER (B1) for the Maternity Units maintained by the Cornwall County Council in connexion with the Camborne-Redruth Miners' and General Hospital. Salary £300 a year, with the usual emoluments. The appointment will be subject to termination by 1 month's notice in writing but will ordinarily be for a period of 12 months.

Applications, together with copies of 3 testimonials, should be addressed to: J. C. FIELD, Secretary-Superintendent.

Redruth, September, 1944.

**CAMBORNE-REDRUTH MINERS' AND GENERAL HOSPITAL,** REDRUTH, CORNWALL. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A). Salary at the rate of £200 p.a., with the usual residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications, together with copies of 3 testimonials, to be addressed to: J. C. FIELD, Secretary-Superintendent.

Redruth, September, 1944.

**HERTFORD COUNTY HOSPITAL. (173 Beds, normal.)** House SURGEONS (A) (2) required to commence 1st November, 1944. Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointments will be for a period of 6 months.

Applications to be sent as soon as possible to—

P. G. BROOKS, House Governor.

**BRADFORD CHILDREN'S HOSPITAL.** Applications are invited from registered medical practitioners (Male or Female), including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of HOUSE SURGEON (A), now vacant. The appointment will be for a period of 6 months. Salary £150 p.a., with board, residence, and laundry.

Applications, stating age and nationality, with recent testimonials, should be sent to—

J. W. LONGLEY, Secretary-Superintendent.

**NORFOLK AND NORWICH HOSPITAL, Norwich.** Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON (A). Salary is at the rate of £170 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when the appointment will be for a period of 6 months.

Applications to be addressed to—

FRANK INCH, House Governor and Secretary.

**VICTORIA HOSPITAL, Accrington.** Applications are invited from medical practitioners (Male) for the appointment of HOUSE SURGEON (B2). The salary is at the rate of £200 p.a., with full residential emoluments. R practitioners who now hold A posts may apply, when the appointment will be limited to 6 months.

Apply, with copies of 2 testimonials, to Hon. Secretary.


# The Medical Defence Union

*Established* 1885

*President:* JAMES FENTON, C.B.E., M.D., M.R.C.P., D.P.H.

*Telephone:* MUSeum 1337

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**ROYAL WEST SUSSEX HOSPITAL, Chichester. (334 Beds.)** Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (B1). Salary at the rate of £450 p.a., with full residential emoluments. Suitably qualified R and W practitioners who now hold B2 posts may apply. Those holding B1 posts can be considered only if they have been declined by the R.A.M.C.

Applications should be addressed to—
K. H. WILLIAMS, House Governor and Secretary.

**ROYAL WEST SUSSEX HOSPITAL, Chichester. Applications** are invited from registered medical practitioners for the appointment of CASUALTY OFFICER AND HOUSE SURGEON (A). Appointment is for 6 months from date of appointment. Salary £150 p.a., with residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply.

Applications, stating age, qualifications with dates, and nationality, supported by copies of 3 recent testimonials, should be sent to the House Governor and Secretary.

**PONTEFRACT GENERAL INFIRMARY AND THE HYDES HOSPITAL.** (112 Beds.) Applications are invited from registered medical practitioners (Male) for the appointment of HOUSE SURGEON (A), vacant immediately. Salary £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications should be sent to— D. J. RICHARDS,
11th September, 1944. Secretary-Superintendent.

**VICTORIA HOSPITAL, Burnley. (169 Beds.) Applications are** invited from registered medical practitioners for the appointment of 2 HOUSE SURGEONS (A). Salary at the rate of £150 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of 6 months.

Applications should be sent to: J. E. WHEATCROFT, Secretary.

**SCARBOROUGH HOSPITAL. Applications are invited from** registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), now vacant. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Salary £550 to £600 p.a., with full residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also those now holding B1 and have been rejected by the R.A.M.C., may apply.

Applications should be sent immediately to the Secretary.

**ROYAL SALOP INFIRMARY, Shrewsbury. Applications are** invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of HOUSE SURGEON (A), vacant 9th October. The appointment will be for a period of 6 months. Salary is at the rate of £160 p.a., with full residential emoluments.

J. P. MALLETT, Secretary-Superintendent.
Board Room, 19th September, 1944.

**SURREY COUNTY COUNCIL. Surrey County Sanatorium,** MILFORD, near GODALMING. (348 Beds.) Applications are invited from registered medical practitioners for the appointment of RESIDENT ASSISTANT MEDICAL OFFICER (B1) for a period of 6 months. Applicants should have held house appointments and preferably have had surgical experience. Salary is at the rate of £350 p.a., plus residential emoluments. Suitably qualified R and W practitioners holding B2 appointments, also R practitioners holding B1 and rejected by the R.A.M.C., may apply.

Apply to Medical Superintendent by 28th October, 1944.

**SURREY COUNTY COUNCIL. Kingston County Hospital,** Wolverton-avenue, KINGSTON-ON-THAMES. Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A), 2 vacancies. Salary is at the rate of £120 p.a., plus full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months; otherwise will not exceed 1 year.

Apply to the Medical Superintendent.

**NOTTINGHAM CITY COUNCIL. The Firs Maternity Hospital.** (40 Beds.) Applications are invited from registered medical practitioners (Male), including R practitioners holding A posts, for the appointment of OBSTETRIC HOUSE SURGEON (B2). The appointment will be limited to 6 months. Salary at the rate of £300 p.a., with full residential emoluments, plus cost-of-living bonus.

Applications, stating age, qualifications with dates, and nationality, should be accompanied by copies of 3 testimonials and sent to: J. E. RICHARDS, Town Clerk.

The Guildhall, Nottingham, October, 1944.

**NOTTINGHAM CITY COUNCIL. City Hospital. Applications** are invited from registered medical practitioners (Male), including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment of RESIDENT JUNIOR HOUSE SURGEON (A). The appointment will be limited to 6 months. Salary at the rate of £250 p.a., with full residential emoluments, plus cost-of-living bonus.

Applications, stating age, qualifications with dates, and nationality, should be accompanied by copies of 3 testimonials and sent to: J. E. RICHARDS, Town Clerk.

The Guildhall, Nottingham, October, 1944.

**CROYDON GENERAL HOSPITAL. (A Voluntary Hospital of** 250 Beds.) CASUALTY OFFICER (A) required immediately. Salary £120 p.a., together with board, residence, and laundry. Practitioners within 3 months of qualification and liable under the National Service Acts may apply, when appointment will be for a period of 6 months.

Applications to House Governor, Croydon General Hospital, Surrey.

**THE ROYAL INFIRMARY, Sunderland. (312 Beds.) Applications** are invited from registered medical practitioners, Male or Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointment, now vacant, of CASUALTY OFFICER AND HOUSE SURGEON (A) to the Ear, Nose, and Throat Department for a period of 6 months. This post is recognised for the D.L.O. The salary is at the rate of £150 p.a., with full residential emoluments. M. J. HUNTLEY, House Governor and Secretary.

**THE CHILDREN'S HOSPITAL, Sunderland. (In association** with THE ROYAL INFIRMARY, SUNDERLAND.) (70 Beds.) Applications are invited from registered medical practitioners, Male and Female, including practitioners within 3 months of qualification and liable under the National Service Acts, for the appointments of HOUSE SURGEON (A) and HOUSE PHYSICIAN (A), now vacant. The appointments will be for a period of 6 months. Salary is at the rate of £150 p.a., with full residential emoluments. M. J. HUNTLEY, House Governor and Secretary.

**ROYAL HAMPSHIRE COUNTY HOSPITAL, Winchester.** (462 Beds.) Applications are invited from registered medical practitioners, Men or Women, for the appointment of HOUSE PHYSICIAN (A), vacant 1st November, 1944. The position carries with it obstetrical work. Salary at the rate of £175 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointment will be for a period of 6 months.

Applications, stating age, qualifications with dates, nationality, and accompanied by copies of 3 recent testimonials, should be sent to: D. M. STANBURY, Acting Superintendent and Secretary.

**CHESTERFIELD AND NORTH DERBYSHIRE ROYAL HOSPITAL.** Applications are invited from registered medical practitioners for the posts of HOUSE SURGEON (A) and ASSISTANT CASUALTY OFFICER (A). Salary in each case is at the rate of £165 p.a., with full residential emoluments. Practitioners within 3 months of qualification and liable under the National Service Acts may also apply, when appointments will be for 6 months.

Applications to be forwarded as soon as possible to—
M. H. BOONE, House Governor and Secretary.

**EAST SUSSEX COUNTY MENTAL HOSPITAL, Hellingly,** near HAILSHAM, SUSSEX. Required immediately, duly registered TEMPORARY ASSISTANT MEDICAL OFFICER (B1). Special experience in mental illness is not necessary. Salary £10 10s. per week, with board, apartments, and laundry. Suitably qualified R and W practitioners holding B2 appointments, also those holding B1 and have been rejected by the R.A.M.C., may apply.

Applications to the Medical Superintendent.

**OVERSEAS EMPLOYMENT. Medical Officers (Male) urgently** required by large Company operating in the Middle East for general and hospital work; should be under 40 years of age; 3 years' agreement. Total salary and emoluments not less than £1000 p.a., with free furnished accommodation, free passages, medical attention, and kit allowance.

Written applications, giving details of age, medical education, and experience, and nature of present work, should be sent to the Secretary, Overseas Manpower Committee (Ref. 1324), Ministry of Labour and National Service, Alexandra House, Kingsway, London, W.C.2.

**Doctors, Male and Female, required for Locums and Assistantships.** Vacancies for Hospital Locums and Ships' Surgeons. Practices and Partnerships for disposal.—Write: A. SHAW, Medical Transfer Agent, Premier Buildings, 88, Church-street, Liverpool.

**Salaried Partner required in January. Provincial Non-panel Prac**tice in Surrey. Own car. Furnished house provided. £1000 a year.—Address, No. 493, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Medical Practitioner, free 1st November, seeks post Wales, £700** per year and furnished house. Partnership with a view preferred; will consider purchasing a practice.—Address, No. 489, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Doctor's Widow, 52, with nursing experience and ability, requires** post as Housekeeper-Receptionist to doctor. Engaged National work but release imminent. Excellent references. London area preferred. Appointment any time.—Write: Address, No. 497, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Practice wanted, Manchester district. Choriton, Withington, or Sale** district preferred, not essential.—Address, No. 499, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Medical Practice for disposal, old-established large mixed Practice** in Country Town on Scottish Borders. Cash receipts over £3000 p.a., which includes a panel of approximately 2450 units. House to rent. Premium by negotiation.—Write: A. SHAW, Medical Transfer Agency, Premier Buildings, 88, Church-street, Liverpool, 1.

**Small Practice for Sale, Stoke-on-Trent district. Death Vacancy.** Could be added to an existing practice.—For details apply: NATIONAL MEDICAL AGENCY, 63, Great George-street, Leeds, 1.

**Wanted to Purchase: Cameras, Enlargers, and all Photographic** Apparatus, Exposure Meters, Tripods, &c., Microscopes, Binoculars, Cine Cameras, and Projectors. Prompt cash and high prices offered.—WALLACE HEATON LTD., 127, New Bond-street, London, W.1.

**Medical Photographs and Drawings for illustrations, records, &c.** —Write for particulars: E. O. SONNTAG, 159, Bickenhall Mansions, Baker-street, W.1. WELbeck 8860.

**May we send specimen of COMPARATOR STETHOSCOPE for** clinical trial? (No obligation); see issue of 18-7-42.—Capac Ltd., 2, Ullswater-road, London, S.W.13.

**Radium: You can hire up to 100 mgms. of radium element made** up to any required specification, for the moderate fee of £5 5s. from: J. C. GILBERT, LTD., Columbia House, Aldwych, W.C.2. Tel.: Chancery 6060.

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